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Edwin Charles Cox

THE railway world is losing one of its outstanding figures in the retirement, on October 10, of Mr. E. C. Cox, Traffic Manager of the Southern Railway. Joining the old South Eastern Railway 53 years ago as a junior clerk, he rose rapidly to become the youngest Superintendent of the Line (of the South Eastern & Chatham Railway) in the country by 1911. During the South African war he had established a reputation when in charge of all military movements over the South Eastern & Chatham system, and the experience then gained he used to great effect during the great war, when he was responsible for an average of 140 trains a day between London and Dover or Folkestone. These trains and the connecting steamers—which crossed the Channel in the busiest months of the war at an average rate of one an hour—are estimated to have carried some thirteen million men, of whom none was lost. A million-and-a-half wounded were also despatched by rail from Dover. His organisation of all this traffic was remarkable in the extreme, as was his organisation of Richborough as a port for munitions. The responsibility for the introduction of the intensive suburban and Brighton line electric services has also rested with Mr. Cox, who has, moreover, had the honour of arranging for the journeys of more royal personages, British and foreign, than any other railway officer, and has frequently accompanied them personally, including the late Queen Victoria and King Edward VII. On a recent journey with Queen Mary, Her Majesty expressed her good wishes for Mr. Cox's retirement, and subsequently sent him her signed photograph together with an endorsed photograph of his late Majesty King George V. Mr. Cox's portrait and biography will be found on page 586 and we join his colleagues and numerous friends in wishing him many years of health and happiness in his well-earned retirement.

* * * *

Why Streamlining is Popular

Both here and abroad, it seems, the streamlining of locomotives could be justified simply on the grounds of its success as a publicity venture. The streamlined Pennsylvania Pacific locomotive, No. 3768 (illustrated in our issue of May 1), has attracted large crowds of spectators throughout an extensive exhibition tour in the United States, while the departures of our own Silver Jubilee express from King's Cross are still presided over by a policeman, who exercises a benign surveillance upon the ardour of autograph hunters, the exertions of sensation mongers who wish to boast that they have placed one foot upon the footplate of *Silver Link* or her sisters, and the suicidal tendencies of amateur photographers. No such enthusiasm was aroused when all the claim that could be made for a new locomotive type was that it was more powerful than its predecessors. Perhaps even speed would have exercised less appeal had it not been exemplified by design so well in harmony with modern taste. Therein lies part of the appeal of the streamlined engine; not only does it give the public what it wants, but it is welcomed as a tangible assurance that that popular favourite—the steam locomotive—is as well abreast of the times as ever.

* * * *

The Week's Traffics

As was the case in the 39th week of the current year the principal increases in the earnings of the four group companies for the past week were in passenger train traffic. In this class of traffic the percentage increases for the year to date are:—on the L.M.S.R. 2·14, against 1·98 at the end of the previous week; on the L.N.E.R. 1·91, against 1·81; on the Great Western 1·33, against 1·18; and on the Southern 1·55, against 1.39. In the percentage increases to date in merchandise receipts the variations from the previous week have been slight except on the Great Western, the L.M.S.R. remaining the same (5·88), the L.N.E.R. rising from 3·98 to 3·99, and the Great Western from 4·32 to 4·40.

	40th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
	£	£	£	£	£	
L.M.S.R. ..	+ 41,000	+ 28,000	+ 9,000	+ 78,000	+ 1,907,000	+ 4·07
L.N.E.R. ..	+ 19,000	+ 14,000	+ 11,000	+ 44,000	+ 1,181,000	+ 3·47
G.W.R. ..	+ 15,000	+ 14,000	—	+ 29,000	+ 505,000	+ 2·57
S.R.	+ 23,000	+ 5,500	+ 500	+ 29,000	+ 286,000	+ 1·78

The increases for the past week shown by Irish railways are:—Belfast & County Down £440, Great Northern £1,500, and Great Southern £5,723.

* * * *

"More for Your Money"

Red plush, we gather from an article in a recent issue of *Collier's* magazine, holds for thousands of American travellers somewhat the same associations of tyranny and discomfort as does milk pudding in the nurseries of Britain. It is remembered as the badge of an age when railway fares were high, carriages ugly and ill-ventilated, and restaurant car tariffs prohibitive. The picture may be a little overdrawn in the exuberance of recalling how decisively America showed her independence by deserting the railway for the motorcar, but at least the author allows

no rankling memories to impair the enthusiasm with which he greets the new policy of lower fares and improved accommodation. These are factors which the railways are exerting themselves to bring to the notice of business executives, because, coupled with the 2 cent-a-mile standard fare, the time-saving of rail travel enables the companies to make out a much more favourable case than before in comparison with motorcoach and private car travel. Under the title "More for Your Money," the New Haven Railroad has produced an attractive illustrated booklet announcing a new Travel Analysis Service, specially devised to inform business organisations of the advantages accruing from rail travel at the new fares.

* * * *

Overseas Railway Traffics

The greatest improvement in Argentine railway traffics during the past fortnight is again that shown by the Central Argentine which has in the two weeks added £58,334 to its former increase. On the Buenos Ayres & Pacific the advance in the same period has been £5,688. The Cordoba Central has, however, reduced its previous increase from £34,270 to £33,120, and the Buenos Ayres Western has taken only £824 off its previous decrease. The fall in Buenos Ayres Great Southern traffics in the past fortnight has been £22,462, as compared with £41,034 in the preceding two weeks.

	No. of Week	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease
		£	£	£	£
Buenos Ayres & Pacific ..	14th	77,235	+ 3,204	1,019,869	+ 10,955
Buenos Ayres Great Southern ..	14th	112,000	— 1,925	1,500,902	— 169,681
Buenos Ayres Western	14th	41,588	+ 3,221	540,584	— 19,026
Central Argentine	14th	146,894	+ 29,165	1,886,253	+ 226,347
Canadian Pacific	39th	934,000	— 28,200	19,988,800	+1,580,800
Bombay, Baroda & Central India	26th	214,950	+ 8,700	4,048,650	+ 237,600

The Canadian Pacific gross increase for the first eight months of 1936 is £1,407,400, but the net increase is only £61,400.

* * * *

Trains Removed from Streets of Syracuse

At many places in the United States railway lines are at street level in the cities, but nowhere has the main line of a major railway shared a common level with road vehicular and pedestrian traffic to quite the extent that has heretofore obtained on the New York Central system at Syracuse, New York, a city of 200,000 inhabitants. There, the New York Central main line traversed one of the principal thoroughfares in the heart of the municipality, and the spectacle of such famous express trains as the Twentieth Century Limited and the Empire State Express proceeding at a snail's pace through crowded streets has long been incongruous. Now it has ceased, for on September 24 the Empire State Express made a ceremonial journey through the streets of Syracuse, and immediately afterwards, amid the din of bells and whistles, the New York Central formally opened its new 4·3-mile elevated line through the city, together with its new passenger station, which has been under construction for the past three years. Projects for the elimination of level crossings in America are now generally recognised as a legitimate object of public expenditure; hence the cost of such improvements is usually borne only in part by the railways concerned, and the balance is advanced by the Federal, State, and local governments.

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Non-Stop Running

In one respect at least the passenger train services of Great Britain can claim an unchallenged supremacy, and it is in a somewhat unexpected direction considering the limited confines of the island in which these records are achieved. We refer to the fact that the eight longest daily steam-hauled non-stop runs in the world take place, during the summer months, on our home railways. Even if diesel competition be admitted, at least five or six of the British runs are still superior in the matter of length. The list is headed, of course, with the 392·7 miles of the L.N.E.R. Flying Scotsman between King's Cross and Edinburgh; and when this run is broken into during the winter with intermediate stops, the L.M.S.R. takes the lead with the run of 299·1 miles from Carlisle to Euston, maintained daily throughout the year. The nearest approach with steam traction to the foregoing on the mainland of Europe is the 226·7 miles of the Nord Express over Northern of France metals between Paris and Liége, followed by the 219·0-mile Paris-Nancy runs of the Est; in America the 188·7 miles of the Pennsylvania between Pittsburgh and Crestline represents the limit, so that the United States could not yet claim a place in the list of daily non-stop runs exceeding 200 miles in length which appears on page 590 of this issue were American steam-operated trains included.

* * * *

A Momentary Lapse

One feels very sorry for a signalman who, after long years of service with a good record, many being spent in one signal box, makes a blunder leading to a collision, as happened at Peterston, G.W.R., on June 10. On page 591 will be found a summary of Colonel Woodhouse's report on this accident, which would have been much worse if the light engine had not been set in motion just before. The signalman's inability to recollect what he had done and to give a coherent account of his actions, makes it necessary to assume to some extent what occurred. It seems to have been a case where a man, having intended—perhaps not too definitely—to do a certain thing, receives an impression a little later that he has done it and half consciously continues on that assumption, which nothing that he sees, or hears even, influences, at least for a time. Probably all of us recollect having done this, though fortunately not in signal boxes. If a man is under such a misapprehension, it is not very difficult to glance out of a signal box window and imagine an engine to be on the line one had intended to put it on, when it is really on the adjacent line. It is also in such circumstances comparatively easy to accept a train by mistake, especially if, on giving "out of section" for one train, "is line clear?" is at once received for the next. There is more of habit and suggestion in these things than we like to admit.

* * * *

A Railway Hotel on Wheels

Pullman cars used on the railways of this country are built as single units and are for day service only. Recently the Pullman Company of America has developed a new type of vehicle consisting of a lightweight streamlined articulated two-unit car so constructed that it can be used in a train composed of vehicles of the present standard types. The body of the new duplex car is built of steel and aluminium alloy is employed for the interior finish: the net weight is 99 tons 17 cwt. The first unit, bearing the name *Advance*, is 74 ft. 6 in. in length; it serves as a sleeping car and contains sixteen rooms or compartments fourteen of which are equally divided between single rooms at the floor level and others reached by three steps up from the aisle. The rear unit, 75 ft. 1½ in. long, is named *Progress* and is devoted in part to room facilities, with a buffet-observation lounge at the rear end. The bodies are 9 ft. 7 in. outside width and 13 ft. 5 in. overall height above the rail. Six of the downstairs duplex rooms are arranged *en suite*, a sliding partition transforming each pair into a single large room. Folding writing tables,

adaptable for serving meals and other purposes, are provided in the *Advance* car; the furniture is of a modern design with tubular aluminium frames. The complete duplex unit is carried on four-wheeled bogies at each end, with a six-wheeled bogie under the centre articulated portion. The new duplex car has been tested on the Twentieth Century Limited train of the New York Central and will next be used on the Pennsylvania Railroad Company's Broadway Limited. Thereafter it will be incorporated in other trains running in different sections of the U.S.A. We illustrate this two-car unit on page 584.

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The "Trianon Burden"

Speaking before the Hungarian Parliament recently on the question of the State Railway finances, a deputy named Görgey, reported to be an authority on transport matters, drew attention to the difficulties confronting the undertaking as a result of the provisions of the Treaty of the Trianon, in which he was supported by the Minister for Trade and Transport, Dr. Winckler. The pensions charge is at present exceedingly heavy, amounting to about 71 million pengös annually, or some 5 million more than the wages paid to the active staff. If it were not for this burden, the operating account would show a satisfactory credit balance of some 15 million pengös. Nearly 30 million pengös are paid yearly to persons formerly serving on the lines in the territories ceded by Hungary at the end of the war, who still have to be maintained at Hungary's expense. In addition, the Minister emphasised, the undertaking is now carrying many classes of freight at rates which do not, or only just, pay, in order to assist industries, chiefly agriculture; the real efficiency of the State railway service is therefore much greater than appears at first sight.

* * * *

De Glehn Compounds in India: (1) On the B.N.R.

Following the universal fame achieved by the du Bousquet-de Glehn compound locomotives on the Northern Railway of France early in this century, and the placing of orders with a Continental firm by the Great Western Railway for three engines of this type, two series of very similar locomotives were built for India by the North British Locomotive Co. Ltd. in 1907 and 1909, both having the 4-4-2 wheel arrangement. The first of these was for the Bengal-Nagpur Railway, and so successful were these engines that their number was increased from 2 to 15, and for many years they handled some of the best trains on that system; it was only when increasing loads made greater adhesive weight essential that they gave place to the 4-6-0 type. In fact, such a reputation had they established, that, in 1929, a much more powerful Pacific design embodying a similar arrangement of cylinders and motion—though otherwise conforming with the Indian "XC" standard type—was introduced on this railway. The resulting fine engines, which were turned out by the same builders, were described and fully illustrated in the August, 1929, issue of our monthly constituent *The Railway Engineer*.

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De Glehn Compounds in India: (2) On State Lines

The second series of de Glehn compounds, ordered from the North British Locomotive Co. Ltd. in 1909, was originally intended for service on the Eastern Bengal (State) Railway, a line where the 4-4-2 type of locomotive was then very popular. In fact, the standard E.B.R. Atlantics running on the crack Darjeeling mail schedules had at that time to maintain in daily service point-to-point speeds never surpassed in India. Actually however, the four de Glehns were not used on that line, and instead, did excellent work upon the North Western system until 1927. To the last their ability to get away smartly and to sustain high average speeds was remarkable. The most curious feature about these engines was, however, the fact that their tenders were fitted with water pick-up apparatus, "curious," because there have never been any water troughs in India, and, so far as we are aware, none were ever seriously contemplated. Possibly the former speed of the Darjeeling mail engendered the idea of future troughs on the E.B.R. main line. At any rate it would be interesting to learn if any of our readers can throw any light on this anomaly.

* * * *

Increasing Use of Roller Bearings on Railways

The adoption of roller bearings for railway axleboxes has proceeded very rapidly during the last few years, and at the moment there are probably not less than a quarter of a million such bearings in regular service on the railways of the world. A number of railways on the Continent of Europe have apparently standardised them for their coaching stock, especially those lines which have adopted electric traction, and numbers of goods vehicles have also been equipped. The application of roller bearings to locomotive journals is proceeding at an increasingly rapid rate, and several thousand such bearings are at work on the carrying axles of locomotives and tenders, especially in the United States. During the last few months fully 150 engines have been ordered with all carrying axles so equipped. Already some of the first bogie axle bearings to be applied have exceeded a distance of one million miles, whilst application to driving wheel axles has gone forward, and quite a number of engines have been so fitted in the United States. The first of these engines, each with a different make of bearing, have now exceeded a mileage of half a million. At least six locomotives with cylinders exceeding 20 in. in diameter have been fitted with roller bearing connecting and coupling rod bearings, and of these three or four must have exceeded 100,000 miles of service.

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New 5 ft. 3 in. Gauge Baltics

On page 583 of this issue we publish an illustrated description of some large Baltic (4-6-4) type tank locomotives recently built in this country for local passenger service on the San Paulo Railway of Brazil. This may be regarded in one sense as an "ordinary" design which, whilst not presenting any outstanding features, incorporates in its general make-up all that is required to provide a powerful and fully equipped engine capable of handling heavy trains under far from easy operating conditions. Locomotives that have to haul trains making frequent stops and re-starts have, as a rule, a harder task than where continuous running over longer distances is entailed, and these new 4-6-4 tanks possess all the attributes that have proved successful on other railways for heavy suburban and similar services. The wheelbase is usually referred to as symmetrical, and the combination of a relatively high boiler pressure and 60 tons of adhesion out of a total weight of 106 tons, with large cylinders and a moderate coupled wheel diameter, ensures ample tractive force available for starting and climbing, and also the ability to run at fast average speeds when opportunity occurs. Constructed by the North British Locomotive Co. Ltd., these engines represent very good examples of the locomotive builder's art in respect of workmanship and general finish. They have been built in accordance with the requirements of the Chief Mechanical Engineer, Mr. P. C. Ford, and under the supervision of Messrs. Fox & Mayo, Consulting Engineers, London.

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On the Way to Standard Revenue

A MOST illuminating and interesting address on "Some Aspects of Railway Finance" was delivered on Tuesday by Mr. W. V. Wood, Vice-President, L.M.S.R., to the Bristol and District Section of the Institute of Transport. Some extracts from it are given in our News Section on pages 588 and 589. It is of particular value also as a corrective of many popular misunderstandings of railway finance. There has been a tendency in many quarters for some time past to write off as obsolete the idea of the four amalgamated companies attaining the standard revenues which Parliament in the Railways Act of 1921 most certainly intended them to have. Mr. Wood, on the other hand, states that there is no reason why in the course of time this level should not be attained. There has been a substantial recovery from the lowest point and if the 1929 gross earnings were reached, with retention of only a third of the reductions in annual expenditure since then, the standard would be about reached and represent an earning of nearly 4·7 per cent. on the capital receipts of the companies. The basis of the standard revenue fixed by the Railway Rates Tribunal is the net revenue of the year 1913, together with certain allowances mainly for fructification of capital expenditure which was not fully reflected in the 1913 figures. At the end of 1935 the standard revenues of the four companies added together would represent £51·3 millions in round figures. The nearest approach to this figure has been the £45 millions of net revenue earned in 1929, when the net revenue of the Great Western Railway was only £162,423 below the standard and that of the Southern only £173,564 below the standard. Supposing that the standard revenues had been attained in 1935 the L.M.S.R. would have been able to pay 7¾ per cent. on its ordinary stock, the L.N.E.R. 4 per cent. on its deferred ordinary stock, the Great Western 8 per cent. on its ordinary stock without recourse to reserves, and the Southern 2½ per cent. on its deferred ordinary stock, leaving amounts to be carried forward much the same as at present.

Mr. Wood defined the term "net revenue" in the railway accounts as the money available on the year's working for interest and dividend on both debenture and share capital. With regard to dividends on guaranteed stocks he explained that if in any year ending on December 31 there are not profits available for the payment of the full dividend on a guaranteed stock, the deficiency has to be made good out of the profits of subsequent years in priority to the payment of any dividend upon the preference and ordinary stocks. If railway net revenues decline, the effect will be to reduce the return on the capital invested and if they improve, the effect will be the reverse, but neither process justifies an artificial alteration of the capital to make the return upon it look better or worse. On the subject of economies Mr. Wood mentions that between 1922 and 1935 the four companies effected a reduction in working expenses of no less than £45,000,000. By its locomotive policy the L.M.S.R. has secured a clear economy of £2,000,000 per annum apart altogether from changes in prices and quantity of work. This result fully justifies the close investigation and supervision which led to it. It included a detailed and prolonged analysis of all the maintenance and running costs of each type of locomotive in relation to performance, decisions on designs in the light of these data and the probable trend of train requirements, and a courageous spending of large amounts on new stock. As Mr. Wood remarks, it is easy to spend money in an expanding industry in times of improving trade but not so easy to do so in an industry beset by the difficulties of the railways in recent years.

Mr. Wood gives an interesting description of the system of budgetary control introduced by his company a few years ago. The supervision of the actual spending in relation to the budgetary estimate is so close that it is generally found that the actual expenditure corresponds very nearly to the budgetary estimate, new circumstances being foreseen and dealt with specially. In the revised form of accounts prescribed in 1928 by the Ministry of Transport the term "maintenance" embraces depreciation, repairs, and renewals. There is a fairly steady expenditure on repairs and renewals and this is charged currently as it is spent. On the other hand, complete renewals, particularly of rolling stock and permanent way, fall in irregularly and these are charged annually on a "provision" basis (except on the L.N.E.R.), representing the average probable outlay, regardless of the actual outlay in a year. Accounting by the four companies and by the London Passenger Transport Board is greatly facilitated by their practice of keeping their accounts in four-weekly periods and not in calendar months, a "private calendar reform," as Mr. Wood calls it. This four-weekly method is adopted in the striking graph of comparative railway receipts which is given on page 588. Each group of weeks from the beginning of 1930 to the second period of 1933 shows a decrease (in the total traffic) from the previous year and each group since, with the exception of the first part of 1935, shows an increase over the previous year.

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High Speed Freight Transport

THE modern tendency for traders, manufacturers, and merchants to carry small stocks and replenish them frequently has created a constant demand for more and more rapid transport, which the British railway companies have been endeavouring with marked success to provide during the last few years. The efficient operation of freight trains at high speeds is obviously dependent to a very great extent upon the provision of adequate brake power. To facilitate fast running, therefore, the railway companies have increased the number of freight train vehicles fitted with vacuum brakes by no less than 50 per cent. during the past four years, the total number in service now exceeding 72,000. By means of these vehicles, the companies have increased the number of express vacuum braked freight trains operated daily from 338 in 1931 to 661 at the present time. The fastest trains are those composed entirely of vehicles fitted with continuous vacuum brake. These are timed to run at average speeds in the region of 45 m.p.h., but in practice attain, over favourable stretches of line, speeds exceeding 60 m.p.h., and frequently have as many as sixty loaded wagons, the total weight hauled by the engine reaching 700 tons. The next fastest trains are those called partly fitted, as they comprise a stipulated proportion of vacuum fitted vehicles formed next to, and directly connected by brake pipe with, the engine, the remainder of the train consisting of non-vacuum fitted vehicles.

Partly-fitted trains are timed at varying speeds dependent upon the number of fitted vehicles formed next to the engine, the total load, gradients, &c., but a number of them reach speeds up to 55 m.p.h. over certain sections of their route. Loads up to 75 wagons are frequently conveyed by these services, which run mainly at night and maintain a high standard of punctuality; many of them are booked to run distances exceeding 100 miles without a stop. Express freight train services operate daily between London and the principal provincial cities and towns, while the latter have, in turn, their inter-city trade

provided for by ancillary services operating in conjunction with the main trunk services for intermediate and branch line stations. The vehicles used on these fast services include open and covered goods wagons for general merchandise, wagons specially designed to ensure the safe conveyance of fruit, meat, cattle, &c., while the rapid development of the container system for the conveyance of traffic in bulk, including furniture removals, has necessitated the construction of special container flats to facilitate loading and unloading operations. By this means, the companies are able to offer regular and reliable one-day transits for general merchandise between all important towns, a facility which is proving of material benefit to trade and industry.

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Swedish State Railways in 1935

THE greatly improved economic conditions that have obtained in Sweden during the last year or two are naturally reflected in the figures in the report on the working for 1935, which indicates an increase in receipts under practically all headings, resulting in the undertaking being able to pay all interest charges out of its own funds without State aid, for the first time since 1930. The following table gives a comparison of the principal figures for the last three years:—

	In millions of Kronor for		
Receipts from—	1933	1934	1935
Passenger traffic	60·0	66·0	70·9
Goods (excluding ore) ..	79·2	90·9	97·1
Ore traffic	4·5	9·0	14·3
Postal traffic, parcels, &c. ..	10·7	10·9	11·1
	154·4	176·8	193·4
Expenses due to—			
Operating	89·6	90·7	92·7
Maintenance (excluding stores)	34·8	37·0	39·9
Pensions	8·4	8·8	9·8
	132·8	136·5	142·4
Working surplus	21·6	40·3	51·0
Profit or loss, after meeting all charges	—15·0	—2·4	+3·1

An exact comparison between these years is, however, not easy to make because numerous changes have intervened to influence the results, such as the taking over by the State of certain private lines, gradual extension of electric traction, road motor competition, alterations to rates and fares, salaries, wages, and pensions. Since the period of commercial improvement began, early in 1933, electrification has been steadily extended, so that about two-thirds of the total load transported in 1935 was conveyed in electric trains; it was rather more than one-half in the previous year. This has considerably affected the working costs; receipts have risen by 38 million kronor since the worst period of depression in 1932, but operating and maintenance costs by only 4·3 million, and part of this sum has been due to charges relating to absorbed lines. Many other savings have been made through altered station working, power and automatic signalling, and other measures. Further steps have been taken to increase comfort in the rolling stock and provide better train connections, while journey times have been cut and additional cheap fare facilities introduced. Passengers carried increased 8·6 per cent., passenger-kilometres 10·1 per cent. and passenger receipts 7·4 per cent. over 1934.

Goods traffic has been affected largely by the development of overseas trade. The export of fish and timber fell but was compensated by an increase in ores, pulp, and paper. Coal represented the heaviest import traffic. The needs of the iron, steel, and building industries, which were all active, gave rise to most of the improvement. Parcels and similar traffic rose considerably, in spite of road competition. Ore traffic increased as much as 58 per cent. and reached nearly 59 per cent. of the 1929 record. A slight alteration in the method of reckoning the traffic to and from the harbour lines at Gothenburg, over which pass many vehicles belonging to the Bergslagernas and Gothenburg—Borås Railways, prevents exact comparisons with previous years, but not sufficiently to affect to any great extent the general tendency. Tonnes of goods, which were 9·4 millions in 1934, rose to 10·0 millions, without the ore traffic, the tonne-kilometres being 1,533 and 1,673 million respectively; this comparison allowing for the above alteration. In loads carried the traffic has actually exceeded that of 1929, but receipts per tonne-kilometre have fallen greatly, being now about 1 öre, a result of the cuts in rates introduced in October, 1930, January, 1931, and January, 1934.

Despite exchange difficulties, passenger traffic to other countries has maintained a high level. The Sassnitz—Trälleborg service carried 115,000 persons, 8,000 more than in 1934; that from Malmö to Copenhagen 249,000, an increase of 15,000; and on the Hälsingborg—Helsingör route there was an increase of 162,000, making 806,000 persons carried. Foreign goods traffic also showed good results on the whole; it was 8·7 per cent. more with Germany, but 12·0 per cent. less with Denmark. Ordinary traffic with Norway was 2·3 per cent. less, but the enormous increase in the ore traffic with that country, 49·3 per cent., masked the decrease altogether. The Trälleborg—Sassnitz route showed increased activity in this respect, but towards the end of the year the traffic from Sweden began to fall off. Imports from Germany over this route rose, consisting chiefly of iron and machinery. The principal charges on the undertaking, beyond operating expenses and pensions, were the guaranteed subsidy towards the ore carrying line from Luleå to the Norwegian frontier at Riksgränsen (the name means "frontier of the realm"), amounting to 3·2, as against 7, million kronor, including some interest charges left from the years 1932 to 1934; the sum placed to renewals account, which was 19·1 millions, against 18·7 the previous year; and the interest on capital invested by the State, 32 millions, or 1 million kronor more than in 1934. Reports reaching us lately indicate that further fare and rate concessions may be expected before long.

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Facilitating High Speeds

WHATEVER opinions may be held about the merits of travelling faster, the fact is that there is an increasing demand for speed, and those who would profit best by this demand will be those who cater for it by anticipating it first. As we have frequently pointed out, railways are in a most fortunate position in this respect, for they alone of all forms of transport can provide high speed with almost complete safety. The safety of travel by rail has always been upon a high level, but until recent years high speed has not been widely practised on railways. Isolated cases there have been, but the general average has been very moderate. Within the last few years, however, as our pages have recorded, the isolated cases of high speed runs have multiplied exceedingly, especially in countries other than our own. France and Germany were the pioneers on the Continent, and are being followed by Italy, Belgium, Denmark, and other countries. The U.S.A. has speeded up to a really astonishing extent in the course of two or three years, and as a result of this, in conjunction with greater comfort and lower fares, has undoubtedly won back much traffic lost to other forms of transport, and gaining new traffic that was non-existent

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before. In Great Britain our progress is characteristically slower, but nevertheless signs are not wanting that we shall be abreast of the others in the course of reasonable time.

With all the speeding up that has taken place, there has been no diminution in the average safety of travel. On the contrary safety has, if anything, increased with the increase of speed, and this is no doubt due very largely to the fact that special precautions have generally been taken before instituting the higher speeds that are now the vogue. On the Continent and in America, improvements to the permanent way and to signalling preceded speeding up. In this country our permanent way was already at so high a standard that little additional work was necessary for such possibilities as, for example, the Cheltenham Flyer and the Silver Jubilee, to become realities. Nevertheless much remains to be done to our permanent way, especially in the direction of eliminating or minimising speed restrictions in order to widen the scope of high speed travel. Realignment of curves has been proceeding steadily on all the main line railways since the war, and has very noticeably improved the running (and consequently passenger comfort) of fast trains. Much has also been done in the way of improved drainage and ballasting, and methods of maintaining the alignment and level of the track.

With the prosecution of such programmes there has been steady progress in ways and means of achieving the end desired. The almost universal use now of Hallade track recorders has been one of the most potent means of accelerating permanent way improvement programmes, and in this and last week's issue of THE RAILWAY GAZETTE we are publishing two articles entitled "High Speed Junctions" which describe one of the most important developments that have ever yet taken place in connection with railway permanent way. By a simple but extremely ingenious method, for which credit must be given to the engineers of the London Midland & Scottish Railway and a well-known firm of makers of permanent way equipment, it is now practicable to provide transition curves and cant through lines diverging from the straight to such a degree as to permit of perfectly smooth and steady travel on the diverging line at speeds upwards of twice as high as would be possible without the incorporation of these devices. Like many important inventions, the simplicity and economy with which this result is achieved tends to engender surprise that it had not been thought of and adopted earlier, but like other inventions it has required the exercise of genius to reveal the simplicity which has paved the way to progress. This new type of high speed junction described in our pages will, there is little doubt, begin a new epoch in permanent way design and practice, an epoch which will be marked by still greater safety, further economy in permanent way maintenance, and in traffic operation, and which will be welcomed no less by the general public for the benefits it will confer than by the engineer and the railway traffic officer who will thereby be enabled to confer those benefits.

* * * *

Cross-Balancing in Locomotives

ACCORDING to a committee report made to the American Railway Master Mechanics Association in 1915, it was thought unnecessary to cross-balance a locomotive with outside cylinders. In other words static balancing was found to be satisfactory for the speeds at which railways were then operating trains. Locomotives with small wheels were used in freight service and ran at low speeds, with 35 to 40 m.p.h. as a maximum, but the wheels on these engines were badly out of balance when the differences in the planes of the revolving parts were considered, and damaged rails were infrequent solely because these small wheeled engines were usually loaded to capacity and operated at very low speeds. A few years ago one of the leading American railways conducted a series of rail tests, and, with the use of an instrument known as the Stremmatograph, was able to determine, at least relatively, the effects of different balances on the rail; these tests proved conclusively the need for cross-balancing. In main driving wheels that were thought to have some allowance for reciprocating weights, the instrument recordings showed a tremendous pressure on the rail when the crank pin was on the bottom centre instead of when the balance was down. A marked improvement was obtained by applying additional weights at right angles to the balances in such wheels, and shortly after these tests it became the practice to cross-balance the wheels on all new locomotives. More recently the Baldwin Locomotive Works has introduced a new type of disc wheel centre obtaining its strength from triangular sections of metal at the hubs and rim of the wheel. With this construction it is possible to reduce the diameter of the axle and crank pin hubs, thus lightening the upper part of the wheel and affording more space in the lower half for the lead in the counterbalance. These wheels are being increasingly applied to new locomotives in the U.S.A.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Notable Emergency Runs

"Westcott," Sedlescombe Road North,
St. Leonards-on-Sea, October 5

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The description in your issue of September 25 of the highly meritorious runs achieved in emergency by old engines is of great interest. With regard to the Ivatt Atlantic's dashing trip with the Silver Jubilee train, I think the schedule allows only 127½ minutes for the 156 miles from passing Doncaster to stopping at King's Cross so that the time of No. 4452 of 139 minutes was 11½ minutes in excess. Possibly it was that, allowing for a start as compared with a passage at speed, the Atlantic's time was no more than eight minutes more than the Flyer's allowance, which you intended to convey in your article. This in no way depreciates a remarkably fine performance which was, I suppose, roughly comparable to some of the most notable time-gaining efforts by these engines on Pullman expresses when one allows for the fact that the Pullman trains, composed of unstreamlined vehicles, weigh at least 50 tons more. No. 4452 was the first of the last series of G.N. Atlantics to be built: the ten which were turned out with superheaters and piston valves at the end of 1910, and she has put up some remarkable performances with heavy trains in years gone by.

Yours faithfully,

R. A. H. WEIGHT

BRITISH STANDARD SPECIFICATION FOR TURPENTINE AND WHITE SPIRIT FOR PAINTS.—The British Standards Institution has issued Specification No. 244, which embodies the revised form of the two B.S. Specifications for turpentine, Types 1 and 2 (B.S.S. Nos. 244 and 292), and that for white spirit (B.S.S. No. 245). The grouping of these three specifications in one publication has been effected in the hope that in this form they will be more serviceable to industry. Copies may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1. Price 2s. 2d. post free.

PUBLICATIONS RECEIVED

The Traveller's Guide to Kenya and Uganda. Nairobi, Kenya Colony: Kenya and Uganda Railways and Harbours. 8½ in. × 5½ in. 232 pp. Illustrated. Folding map. Paper covers. No price stated.—A new issue has been published of this useful travel book, the first edition of which was reviewed in our issue of October 25 last year. Railway travel and excursion facilities figure prominently, and intending visitors will read with pleasurable anticipation the 50-page section entitled "With the Kenya and Uganda Railways on Tour." Reference to railways is not omitted in the section on big game, for it is stated that the traveller in trains of the Kenya and Uganda Railways on certain routes can see more game in a day from the carriage windows than any normal man could see in a lifetime in the ordinary zoos of the world. All necessary information is given for the sportsman, as, indeed, it is for those who travel to Kenya and Uganda for any other holiday purpose.

The Institute of Transport Examinations: Second Edition. London, 1936: The Institute of Transport, 15, Savoy Street, Victoria Embankment, W.C.2. Pp. 86. 9½ in. × 6 in. Paper covers. Price 2s. 6d.—This useful little handbook, edited by Prof. H. M. Hallsworth, C.B.E., and described in the sub-title as "Notes for the guidance of candidates unable to attend preparatory courses," was first published in the summer of 1934. The preparation of this second edition has allowed for considerable revision and enlargement of the original notes. The various branches of the transport industry are dealt with in separate sections, designed, as Prof. Hallsworth explains in his introduction, "to assist candidates to understand the nature and range of the subjects covered, the best methods of approaching and studying these subjects, and what are the principal authors and books dealing with them." Three new sections have been included dealing with the Elements of the Law of Ocean Carriage, Economics of Sea Transport, and Sea Transport Operation. Probably the most useful feature of the handbook is the advice given as to reading.

La Locomotive Actuelle: d'après le Mécanicien de Chemin de fer de L.-P. Guédon (The Modern Locomotive from the Driver's Point of View, by L.-P. Guédon). By Raoul Vigerie and Emile Devernay. Paris: Dunod, 92, Rue Bonaparte (VI). 8¾ in. × 5¼ in. × 1 in. 607 pp. 552 fig. Price not stated.—This is a book of outstanding interest and utility. Nominally and in spirit, it is a revision of Pierre Guédon's admirable treatise *Le mécanicien de chemin de fer*, the last edition of which appeared in 1920. Actually, as pointed out in a preface by M. J. Lancrenon, Chief Mechanical Engineer of the Northern Railway of France, it is a new book that now appears under the title *La locomotive actuelle*, taking full account of the far-reaching improvements effected in steam locomotives during the past decade and leaving the reader with a firm impression that the possibilities of steam traction are still far from being exhausted. The authors are well equipped for their task, Monsieur R. Vigerie being Ingénieur de l'Institute Industrielle du Nord and Ingénieur honoraire du Matériel et de la Traction of the Northern Railway of France, and Monsieur E. Devernay, Inspecteur divisionnaire du Matérial et de la Traction of the same system. In accordance with the intentions of M. Guédon, the mathematics in the volume are kept down to the minimum essential for a precise appreciation of the thermodynamic principles involved in the design and operation of modern locomotives. In few, if any, places does the book rise above the heads of the superintending and subordinate officials for whom it is intended, and it offers them—and, in fact, to all except specialists—a very welcome description of modern locomotive components, clear and concise, yet sufficiently detailed to meet all ordinary requirements. The work is international in scope and appears to be quite impartial in its descriptions. We can recall no other book which brings together quite as much useful information, and the profuse illustrations form a valuable feature, though some have suffered in reproduction.

An introductory historical survey explains the nature and reason for the main developments in locomotive evolution. The basic terms and principles of heat, work and the steam cycle are dealt with admirably in a section of 40 pages. This brings us to the two main parts of the book, each of about 200 pages, dealing respectively with the production and utilisation of steam. The first of these sections describes and illustrates the constructional features of the boiler, firebox and grate, covers operating details and the use of different fuels, and includes very useful chapters on blast pipe and feed pump arrangements, superheaters and safety devices. The section on the utilisation of steam naturally commences with chapters on distribution methods and equipment. Here we find adequate treatment of such developments as the Willoteaux, Dabeg, Renaud, Cossart and Caprotti valves and valve gear, and a very proper insistence on the vital importance of large and properly formed steam passages. An excellent chapter on valve setting is followed by others dealing respectively with motion work and lubricating arrangements. Indicator cards, compounding and tractive effort are among the topics of the next chapter, leading to a discussion of methods for increasing the efficiency of locomotives and a chapter on testing, including notes on the Swindon, Grünewald and Vitry plants and Sir Nigel Gresley's proposals for a test station.

Pneumatic and electric remote-control systems for reverse running of suburban trains are explained; and valuable notes on riding characteristics are incorporated in the chapters on frames, wheel sets, springing, and cognate matters. Tenders and brakes form the subject of the last part of the book; but there is a 53-page appendix describing typical locomotives of many different nations and including many of the experimental engines of recent years. Thanks to a detailed list of contents, a good index and the excellent general arrangement of the subject matter, it is easy to extract from this book any desired information from the abundance it presents.

White Anti-Friction Metals.—A conveniently arranged loose-leaf catalogue from the Eyre Smelting Co. Ltd., Tandem Works, Merton Abbey, London, S.W.19, lists the characteristics of Tandem anti-friction white metals and alloys, Babbitt and Magnolia metals, and of Eyre bearing metal. The last-named was specially developed for the lining of carriage and wagon axlebox brasses, for which purpose it is now being supplied in large quantities to railway companies throughout the world. Recommended uses for this and the other metals and alloys, among them the new Tandem Plus brands for diesels, are listed at the end of the book, and there is a useful introduction giving notes on the selection of a bearing metal. A page of instructions is given for heat treatment of Tandem white metals, and a list of Esco brand white metalling accessories and equipment, so that the catalogue is also something of a handbook.

Special Steels.—The September issue of *Colvilles Magazine* contains a selection of interesting illustrated articles on engineering and general topics. There is a description of the streamlined Pacific locomotive of the South Australian Railways centenary train (*see* our issue of May 22 last), in the construction of which special brands of steel manufactured by Colvilles Limited were used for the boiler and firebox plates, this being the only notable departure from Australian materials. The Empire Exhibition at Johannesburg is surveyed in another article, accompanying which is an illustration of a 4-8-2 tank locomotive of the Randfontein Estates Gold Mining Co. Ltd., in which Colvilles' steels have been almost exclusively used. Colvilles Limited, whose address is 195, West George Street, Glasgow, C.2, also sends particulars of Ducol high-tensile, and Dalzo rust-resisting, steels. Ducol is used for the main frames of the L.M.S.R. turbine locomotive, and Dalzo has been adopted by the same railway company for certain mineral wagons, for which it has the advantage of offering considerably longer life than mild steel. Dalzo is also particularly suitable for locomotive tenders.

XUM

THE SCRAP HEAP

NOT SO BAD AS ALL THAT!

"Falling leaves and glories in decay" is the inscription on a new L.P.T.B. pictorial poster now being exhibited inside the tube coaches of the former UndergrounD.

* * *

"This thing has gone too far," said the absent-minded passenger watching the station at which he should have alighted disappearing into the distance.

* * *

"DÉFENSE DE CRACHER"

The legend *défense de cracher* is well known to anyone who has travelled in France. In Ireland, however, we are more easy-going, and, in spite of public notices here and there, a certain broadness of mind exists on the point. In illustration of this pleasant laxity, I have heard of a certain elderly and dignified lady who, being forced to spend some time at a small country junction where there was only one waiting room for all, was disgusted and annoyed by the continual spitting of two countrymen who had evidently never heard of the phrase *défense de cracher*, or its Irish equivalent. At length, unable to bear it another moment, she rose in dignified disgust, and sought the stationmaster. "Stationmaster," she said, "are people allowed to spit in the waiting room of this station?" Never be it said of our functionaries that they forget their manners. "Begob, ma'am," said he, "ye can spit where ye like!"—"*Quidnunc*" *in the "Irish Times."*

* * *

In America a lucrative business is carried on with little models of locomotives placed in waiting rooms and vestibules of hotels, which are set in motion and run a certain distance by the slipping of a coin into them through a slit, and recently a Saxon railway engineer has constructed a similar little engine, the receipts of which go to the Saxon Railway Pension Fund, and its takings are very great. Here is a hint for the Railway Benevolent Institution.—*From "The Railway News" of July* 21, 1888.

* * *

Over 16,000 clocks, including 200 synchronised clocks at Euston, were involved on the L.M.S.R. alone in the change-over from summer to winter time at 3 a.m. on Sunday last.

This poster completes the second series of attempts to stimulate care and thought. Your co-operation is necessary to increase our carryings and to cut out bad working; thank you for all you have done to bring this about.
We shall welcome any views or suggestions you may have to put forward—write to the Chief Goods Manager, Paddington Station.
SPEED IT UP
BUT
DON'T BREAK
IT UP

No. 13 of a series of "claims prevention" posters recently issued by the Chief Goods Manager, Great Western Railway, for exhibition to the staff

One Hundred Years Ago

Extracts from the October, 1836, issue of "The Railway Magazine" (afterwards "Herapath's Railway Journal") and the oldest constituent of THE RAILWAY GAZETTE

Great Western Railway.—At the second half-yearly general meeting of the Great Western Railway Company, held at the Guildhall, Bristol, August 25, 1836, Benjamin Shaw, Esq., in the chair, it was resolved that the directors be authorised to apply to Parliament in the ensuing session for powers to carry into effect the provisional arrangements already effected, for continuing the line of railway from Acton to the proposed terminus at Paddington, and, in the mean time, to take all such measures as may appear to them expedient, to secure the opening of the work at the earliest possible period.

Durham and Sunderland Railways.—Since the opening of these railways, a novel experiment has been tried upon the line, which proves the practicability of railroad vehicles being propelled by wind. A temporary mast and sail were erected on a vehicle, which was set agoing at an easy rate. On the sail being trimmed to the wind the speed increased to the rate of ten miles an hour. A train of five coal wagons was afterwards attached, but no additional sail hoisted.

Railway to the Cove of Cork.—At a meeting held in Cork of the gentlemen interested in the projected railway to Cork, it was resolved that subscriptions should immediately be set on foot for the purpose of surveying the ground between Cork and Cove. Opinion at present appears to favour a commencement near the present packet-office; then a water level by Glanmire then by the rear of the Little Island and the eastern shore; then across to Merino, and so, by the river's edge, to Cove.

Schultz's Railway Carriage Spark Arrester.—The Franklin Institute of Pennsylvania has reported favourably of this invention, which consists of a sheet of wire gauze placed near the bottom of the chimney, the chimney being there enlarged to allow of sufficient draught. The steam is turned in above the gauze, which will tend to prevent the choking of it by a combination with soot, &c. The objection seems to be a fear of too rapid destruction of the gauze by the heat it is exposed to.

Railroads in America.—The last New York papers announce the opening of the longest continuous line of railway in the United States on the 25th ultimo, the Utica and Schenectady railways, an event of considerable interest to the people of the United States, no similar undertaking of equal magnitude having been previously completed in that part of the world, nor, indeed, in any other. The time occupied in its construction is stated to have been 21 months, the length of the line being 77 miles, and its cost, including 8 locomotive engines and 100 cars, $1,500,000 (about £310,000 sterling). The first excursion, from Utica to Schenectady, was performed in 4 hr. 20 min., the time consumed in running, allowing 53 min. for stoppages, being 3 hr. 20 min.; while the return journey was accomplished in 4 hr. 9 min., the time occupied on the road, deducting 36 min. for stoppages, being 3 hr. 33 min.

Railroad in Russia.—A locomotive engine, of the most superior workmanship, which has just been constructed for the Petersburgh and Pawlowsky Railway at the manufactory of R. Stephenson & Co. has had a trial, and exceeded the extraordinary speed of 65½ miles an hour!

Stage Coaches and Steam Vessels.—"The first stage-coach in Scotland," says Dr. Cleland, "was, in 1678, started by William Hume, to run between Glasgow and Edinburgh, a distance of forty-two miles. It was to start from Edinburgh every Monday morning, drawn by six able horses, and return, God willing, every Saturday night. The fare from March 1, to September 1, was £4 16s. Scots, and from September 1 to March 1, £5 8s. Scots. The first steam-vessel was the *Comet*, which started in January, 1812, to ply between Glasgow and Greenock. She made five miles an hour against a head wind, and afterwards, by increasing her power, seven miles."

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

ARGENTINA

Engineering and Transport Annual Dinner

The sixth annual dinner of the Centre of Engineering was held on August 21 in the Retiro station restaurant of the Central Argentine Railway, Buenos Aires. Nearly 200 were present, and the special guests were the British Ambassador (Sir Neville Meyrick Henderson, K.C.M.G.), Mr. E. R. Lingeman (Acting Commercial Counsellor, British Embassy), Mr. Ronald Leslie (the retiring General Manager of the C.A.R.), and Dr. Manuel F. Castello (President of the Argentine Centre of Engineers). Mr. Ormond Steven (Chief of Operating, B.A.G.S. and B.A.W. Railways, and Chairman of the Centre), who presided, proposed the loyal toasts, and the toast of " The Centre " was proposed by Mr. Lingeman, who paid a tribute to the work of the engineering societies represented at the gathering. He then referred to the forthcoming departure of Mr. Leslie, who, he said, had given of his best to the furtherance and protection of the important British interests committed to his charge, and who had helped to maintain the prestige of Britain in Argentina. Mr. Lingeman ended by touching upon the difficulties in the way of the revision of the Roca Treaty that had arisen, and asked for reason and understanding from all concerned.

Unity of British Engineers in Argentina

The speech was responded to by the Chairman, who, on behalf of the institutions comprised in the Centre, expressed their appreciation of the presence of the British Ambassador, in view of his many engagements. He also referred to the activities of the Centre, and the continuous progress during the last seven years, remarking that in no other country in the world were British engineers so intimately associated in a common purpose as in Argentina.

The British Ambassador expressed his thanks to the committee and members of the Centre and his pleasure at being present, and then Mr. C. R. S. Harris (Director-General, B.A.G.S. and B.A.W. Railways) paid another tribute to Mr. Leslie and his work. Mr. Harris was followed by Dr. Castello, who mentioned the importance of the British-owned railways in the development of the country, and the debt owed by Argentina to the British people for the services rendered to it by the railways. The concluding speaker was Mr. Leslie, who, after making a humorous reference to the propensity of engineers for " spending other people's money," warmly thanked everyone for the pleasant words spoken about him in connection with his forthcoming departure, and wished all members and friends of the Centre the best of luck.

Funds for the State Railways

A supplementary estimate for the expenditure of the sum of $44,348,633 paper on renewals and improvements on the State Railways, which had been passed by the Chamber of Deputies, has been sanctioned by the Senate. The amount in question will be allocated as follows:—

	$ Paper
(*a*) Renewal works and construction of new branches (including an important siding on the Patagones-Lake Nahuel Huapi line, at a cost of $900,000 paper)	24,621,633
(*b*) Bridges and culverts ...	1,361,000
(*c*) River defence works ...	300,000
(*d*) Level crossings and fencing	800,000
(*e*) Buildings, installations and equipment	17,266,000
Total	844,348,633

The necessary funds will be provided by means of " Credito Interno " bonds, bearing 6 per cent. interest and 1 per cent. amortisation.

CHILE

Funds for the Transandine Railway

According to news from Santiago, the Commission of Public Works of the Senate has approved the proposal made by the Executive Power to vote the sum of 1,400,000 pesos (approximately equivalent at current exchange rates to £14,309) to the Transandine Railway to make up the deficit on working, and provide for the payment of salaries and other items of expenditure.

The Iquique—La Noria Railway Concession

The news [published on page 413 in our issue of September 11—ED. *R.G.*] that the Government had terminated the concession granted to the British-owned Nitrate Railway Company for the working of the above line has been confirmed. According to the latest information from Chilean sources, the administration of the line will be vested in that of the Iquique-Pintados Railway, a Government concern which has been a serious competitor of the smaller railway for a long time. The Iquique-La Noria Railway has a length of 41 miles, slightly over 11 per cent. of the total mileage of the Nitrate railways. Negotiations for the renewal of the concession have been proceeding for some time, but the present policy of the Chilean Government appears to be against renewing concessions for any privately-owned lines it is feasible to incorporate into the national railway system.

State Railways Report for 1935

The Government report on the State Railways for the year 1935, which has just been issued, shows a net profit on working of 12,500,000 pesos (approximately equivalent at current exchange rates to £127,760), of which sum 8,000,000 pesos (about £81,766) will be distributed as a bonus to the employees and workmen. The report states that the tariffs between Santiago and Valparaiso have been reduced, with a view to meeting the increased competition from motor traffic between these cities. Large sums have been allocated to the construction of new stations at Valparaiso, Calera, Puerto Varas, and elsewhere, and new hotels have been built at Pucón and Puerto Varas as part of the railway policy to attract tourists and encourage excursion traffic. On some of the lines, where the traffic offering does not justify the running of ordinary trains, these have been replaced by railcars.

BOLIVIA

Railway Returns for 1935

According to the report on the working of the State and privately-owned railways of the republic during the year 1935, just issued by the General Directorate of Statistics, the number of passengers carried by the State Railways during the period under review was 711,475; 209,129 tons of goods were also carried. Receipts amounted to 6,269,029 bolivianos (approximately equivalent at current exchange rates to £125,381). Working expenses were 4,218,795 bolivianos (approximately equivalent to £84,376). The report gives the number of passengers transported by the privately-owned railways during the same period as 724,470, and the volume of goods handled 637,634 tons. The total receipts were 17,835,265 bolivianos (approximately £356,705). Working expenses were 9,071,435 bolivianos (approximately £181,429). The aggregate revenue of the State and private railways during the period under review is given as 24,104,294 bolivianos (approximately £482,086), and the aggregate working expenses of the combined systems amounted to 13,290,230 bolivianos (approximately £265,805).

NEW ZEALAND

Railway Budget

Railway expenditure out of renewal funds contained in the departmental budgets for the year ending March 31, 1937, is estimated at £1,209,432, compared with £849,751 last year. Among the principal items are locomotives, £160,935; carriages, £118,830; wagons, £305,450; railcars, £32,500; permanent way, £200,766; bridges, £110,300; road motor vehicles and the purchase of road

services, £121,100. In addition, a sum of about £600,000 will be provided in the Public Works Estimates for the construction of new lines, notably the South Island Trunk line, the Napier-Gisborne line, and the Westport-Inangahua section.

SOUTH AFRICA

Transport Conference and Railway Gauge

The Surface Transport Committee of the Southern African Transport Conference has passed the following resolution :—

That the most suitable railway gauge for Southern African conditions, physical and financial, is the 3 ft. 6 in. gauge, and it is recommended that where practicable this should be kept in view by the various administrations concerned, particularly in such matters as designing of new rolling stock and sleepers in such a manner that they can be subsequently adjusted to permit of use in connection with 3 ft. 6 in. railways.

The committee also decided to recommend the establishment of a permanent secretariat to deal with matters which cannot be finally disposed of at the conference, the intention being that the secretariat should maintain contact with the various transport administrations represented at the conference and in that way a valuable permanent organisation would be brought into being.

Ministry of Transport

At the annual convention of the South African Federated Chamber of Industries a sub-committee was appointed by the Chamber to consider the question of a Ministry of Transport and submit a report. The report states :

The fullest consideration was given to all aspects of this important question, but the committee was hampered in its efforts to recommend concrete proposals by the absence of information on a variety of questions relating to transport, including the Acts of Parliament referred to by the Minister of Railways in his last budget speech, the relative importance of different forms of transport which vary according to commodities and areas, the practicability of the formation of an active Ministry of Transport on which it considers the Government should express an opinion, and the views of those sections of the community engaged in the business of common carriers, all of which information is, in its opinion, essential to a proper study of the problem. It can therefore only speak in general terms and considers that a Ministry of Transport which in essence is only a glorified Railway Ministry, may not offer any advantage over the present system. It cannot say to what extent the control of private carriers and firms undertaking the transport of their own commodities for distribution should be regulated under a Ministry of Transport, for the reason that the whole question is wrapped up in the final decision as to the form such a Ministry should take and the degree of control put into its hands.

The committee recommended that the Minister of Railways be advised that the question was too complex to allow the Chamber to make concrete suggestions in the absence of further information. Also that that convention might express itself in favour of the proper co-ordination of all forms of transport so that no one form was favoured at the expense of another, but so that all were adequately developed in the public interest. Finally it recommended that at this stage only this general principle should be the guide in any views expressed by the Chamber on the question.

INDIA

Monsoon Causes Suspension of Important Train Services

Considerable disorganisation has resulted from abnormal rainfall since September 10 on the Grand Chord line of the East Indian Railway, causing several breaches. From September 13 the Calcutta—Bombay mails over the E.I.R. have been suspended, and passengers have been advised to travel via the Bengal-Nagpur line. Connections from and via Patna have been maintained with the G.I.P.R. Allahabad—Bombay services, and Grand Chord line trains have been diverted via the main line and Patna, though this line also was less seriously breached. The E.I.R. Bombay mail had not been put on again by September 16.

Railways and Commerce

In order to secure full information on railway freight matters so that representations may be made to the Railway Board for alterations in rates and in the general classification in the interests of both the railways and the trade, the Bombay Chamber of Commerce has circulated to members the following questionnaire :—

Where do you obtain information as to rates ? What difficulties have you experienced in obtaining such information and what remedies for these difficulties do you suggest ?

Can you quote examples to show that the existing rates adversely affect the interests of the railway and of commerce, industry and agriculture ?

How can the railway tariff publication be simplified and improved ?

If the Chambers of Commerce of the other provinces also collected similar information and then met to draw up a joint representation suggesting a concrete scheme of improvement of the complicated goods tariff, the Railway Board would not hesitate to give its earnest consideration to the joint views of the community that was most affected by the existing rates machinery which is absolutely confusing.

FRANCE

French Co-ordinators Study London Transport System

An interesting review of transport organisation in the area under the control of the London Passenger Transport Board is given in the September issue of the *Revue Générale des Chemins de Fer* by M. Raoul Dautry, General Manager of the State system. After a brief historical survey of the development of omnibus, tramway, motorcar, and railway traffic in the London district, M. Dautry deals with the co-ordination of traffic under the board. He emphasises the facilities offered by the extension of the Metropolitan Railway services on the suburban lines, and the co-ordination of rail and road services. The article is well illustrated by excellent maps and graphs. In his capacity as President of the Comité de Co-ordination du Rail et de la Route, M. Dautry foresees the advantage of adapting and utilising in the Paris area the benefits of London's experience. The article is the second of a series of three, in which other organisations of the "public trust" type are studied, notably the British Broadcasting Corporation, the Metropolitan Water Board, and the Electricity Grid.

SPAIN

Railway Militia Enrolment

A recent circular distributed among railwaymen in Madrid and on all the systems under the control of the Government is eloquent of present conditions in Spain. The circular begins thus : "The Directing Committee of General Headquarters of Railway Militias, composed of representatives of the National Railwaymen's Unions and of the National Federation of the Railway Industry, address hereby all railwaymen and workers in general." After a rhetorical invocation to patriotism, the circular says, "The National Confederation of Labour and the General Union of Workers (the C.N.T. and the U.G.T.) ask and require of all their militias that those who are not actually employed shall immediately enroll in the national militias, and those who have arms deliver them up, today rather than tomorrow. . . . the password is all guns to the front . . . . Comrades, we await your enrolment or your weapons."

New Madrid Station

The Committee of Exploitation of Railways in Madrid has issued a notice advising the opening of a new goods station, near the principal markets, in which all perishables may be brought directly from the sources of supply to the markets and thence to the consumers, without passing through the classification sidings, and so with the minimum of delay. The committee adds that this improvement now introduced has been long overdue, but has hitherto been impossible, owing to the "unexplained resistance of the railway companies."

Communication Between North and South

According to the headquarters at Burgos, the whole of the main trunk lines north and west of Avila are in the hands of the insurgents, and through services are now established between Irun, San Sebastian, and Seville, via Salamanca and Mérida. The bridge on the main line between Alanis and Cazalla was reported in Madrid to have been blown up on September 19 by militias and a gang of miners from Azuaga, thus cutting communications with Seville, but this report has not been confirmed.

102 MILES AN HOUR ABOARD THE HIAWATHA

(From a correspondent)

THE daily service of the Chicago, Milwaukee, St. Paul, & Pacific streamlined express, the Hiawatha, between the Union station, Chicago, Milwaukee, and the Twin Cities (St. Paul and Minneapolis), involves the use of more than one train; three streamlined locomotives, and a number of air-conditioned coaches, Pullman, and parlour cars, available without extra charge, are in service. Since the introduction of these trains in 1935, the public patronage has been so great that on frequent occasions three and four trains are run, especially at week-ends, and more rolling stock of a similar type is understood to be on order. The 410-mile journey in each direction is covered in 6½ hr., inclusive of five intermediate stops.

Passengers may board the train from 12 noon, and luncheon at popular prices, 50 cents (2s.), is served in an air-conditioned combined modern restaurant and buffet car, marshalled next to the engine, fitted with tubular steel furniture; the buffet is equipped with radio and known as the "Tip Top Tap." The colouring of the Hiawatha train is very striking, the scheme being a combination of silver grey, bright orange and maroon; the silver grey extends from the front of the locomotive in an unbroken line along the carriage roofs, while maroon is used as a border above and below the orange colour which covers the sides and ends of the whole train. The oil-burning streamlined Atlantics, known as the "Milwaukee" type, were built by the American Locomotive Company.

A lighted neon electric sign directs travellers at the Union Station, Chicago, to the departure platforms of the Hiawatha, where porters dispense small clip-on coloured labels for handbags, attaché cases, and packages to assist in the unloading of passengers' luggage; only hand luggage is taken by this service. Visitors are allowed to inspect the trains and accompany passengers on board; a solemn announcement, "all visitors off," is made by the coloured attendants, and the individual adjustable armchair seats which are fitted two on each side of the gangways, and can be adjusted to sit upright or to recline, as well as to turn round to face the direction of travel, are quickly taken by passengers who are actually travelling on the train. Prompt to time the first part of the Hiawatha leaves at 12.55 p.m. and the second part at 1 o'clock, accelerating rapidly to a steady 40 m.p.h. to Western Avenue, Chicago, where there is a turn to the north. Factories change to homesteads, parks, and open spaces, on which on a Sunday afternoon amateur baseball games are in full swing. Through Forest Glen Park small batches of holidaymakers watch the Hiawatha pass, and even golfers stop their game. The speed mounts up to 80 m.p.h. as the train crosses two new arterial roads into the open countryside, which is almost flat.

Open parklands and golden fields follow, with piled-up white clouds against a blue sky, in contrast with the sweeping clouds of oil-bearing smoke which are poured out by the locomotive. Through Wadsworth, 43 miles from Chicago, in 43 minutes, a walk along the train shows steady riding and a high percentage of women and children passengers. Travelling ticket collectors are working their way to the rear, followed by a white-coated attendant with sandwiches and hot coffee. In a flash the train is over the border from Illinois to Wisconsin. Bridges flick overhead, wide fields of maize, and black and white cattle are noticed, and between Ranney and Sturtevant, for a distance of just over ten miles, the Hiawatha touches 102 m.p.h. A young man going all the way to Seattle expresses delight as "she goes out after it and gets along." Towards the rear the last two cars are Pullmans, ending in a streamlined beaver tail which rocks, but not uncomfortably. It is not many more minutes until Milwaukee is seen on the horizon, where with the approach of the first factory, the speed is checked to 60 and then to 45 m.p.h., as a miscellany of warehouses, lake steamers, seed stores, and other buildings flash past; 30 m.p.h., 15 m.p.h., and at 2.15 p.m. the train makes its first stop, having covered 85 miles in 75 minutes.

At Milwaukee a No. 16 street car travels more sedately and with rather more noise through the streets to Washington Park, four miles from the station, where the peace of Sunday afternoon is refreshed by glimpses of clean kiddies on a boating lake and iced tea in a park café. Back again to the station, the return Hiawatha is found to be running in four sections.

A perfect sunset over the illimitable acres of the West brings the shadows of evening and thoughts of the pioneers, redskins, and the days of the covered wagon trek when the first wheels turned very slowly over this countryside. The four trains travelling at 70, 80, 90, and 100 m.p.h. within a few minutes of each other are racing against time towards Chicago, and a delightful experience ends as a good-looking mother of a young family in the next seat orders father to go and wash himself "before we get there"—an order which is instantly obeyed.

Rubber for Noise Reduction

The judicious use of rubber in the construction of railway vehicles is one of the most efficacious means of reducing noise and vibration, thus providing a greater degree of riding comfort for passengers. As reported in our contemporary *The Commonwealth Engineer*, careful investigation of the matter has led the Victorian Railways commissioners to fit rubber pads of a kind specially developed for railway use, in the underframes of their passenger rolling stock. A number of suburban electric carriages, sleeping cars, dining cars and other types are being fitted, whilst coaches now being constructed for the all-steel Sydney Limited express train will be similarly equipped. The india-rubber pads are located between the bearing surfaces of the underframe and bogie, and also between the bogie side coil springs and bogie frame, a typical pad, rectangular in shape, being located at the bogie centre. On the underframe at the side bearings, a rectangular rubber pad ½ in. thick is bolted in place through india-rubber bushed holes, being interposed between the rubbing plate and the underframe. This assists the centre plate pad in cushioning the shocks between the underframe and the bogie when the vehicle traverses curves. A circular rubber pad ½ in. thick is housed between the top of the side coil springs and the bogie frame, and flanged india-rubber bushes surrounding all the bolts used in the rubber pad assembly, together with the pads, completely eliminate any metallic contact between the centre plate and side bearing connection from the under-frame to the bogie, thereby reducing the transmission of vibrations and noise from the running gear to the car body. The resilient property of the rubber dampens the dynamic forces on the springs and tends to improve the riding qualities of the car. It is interesting to note that the rubber fittings above described were designed and manufactured by a well known British firm, George Spencer, Moulton & Co. Ltd.

THE SKODA LOCOMOTIVE BOOSTER

A system of air-operated clutches is used, permitting of shockless engagement at high speeds

THE Skoda locomotive booster illustrated herewith comprises a twin-cylinder superheated steam engine mounted in a sprung bogie, and fed with steam from the locomotive boiler. The booster cylinders drive a crankshaft with a pinion which meshes continuously with a large gearwheel revolving freely on the driving axle, so that the booster is out of action when not required. For engaging the booster, a patented combination of air-operated friction and dog clutches is provided that permits of shockless coupling even at high speeds.

The booster engine is of the horizontal type, and the two cylinders with their steamchests are cast integral with the crosshead side covers, the whole block being of cast steel and constructed as a frame stretcher. The cylinders are bushed with cast-iron liners, and the piston valves, of the inside admission type, are operated by return cranks. The cylinders and valve chests are lagged with asbestos and clothed with plain sheets. Particular attention has been given to cylinder drainage owing to the intermittent nature of the work and the long steam pipes. Each cylinder is fitted with three large specially designed automatic air-operated drain valves, which are held constantly open when there is no pressure in the air piping (*i.e.*, when the booster is out of action) by springs acting on the piston of the air cylinder.

The crankcase, likewise designed as a frame stretcher, houses the motion and the valve gear. The piston rods connect with light cast steel crossheads and light connecting rods. The cranks are forged solid with the crank pins and counterweights, and are pressed on the crankshaft, which latter is carried in two bearings affixed to the base of the crankcase. The return cranks drive the piston valves through eccentric rods and transverse shafts with levers and pull rods.

The pinion, seated on a spherical surface of the crankshaft, is connected thereto by means of a special articulation device. The articulated joint allows not only for the transmission of the torque, but also for the pinion to follow all the displacements of the driving axle that may occur on the road, so that the teeth over the whole length are always in mesh. The large gearwheel fitted on the driving axle meshes continuously with the pinion, but whilst the booster is out of operation it is free to revolve on the axle. For transmitting the tractive force, the driving axle is coupled to the gearwheel with the help of the two clutches, of the friction and dog types. The multiple disc friction clutch synchronises the speed of the booster engine with that of the axle before the other clutch is engaged. The dog clutch transmits the whole torque when the booster is fully steamed; the booster clutches are air controlled. The drawing, Fig. 1, shows the arrangement of the parts and connections. Fig. 2

1.—Branch pipes from main steam pipe.
2.—Steam inlet valve.
3.—Steam inlet piping.
4.—Booster throttle valve
5.—Steam to shut-off and idling valves.
6.—Shut-off valve.
7.—Idling valve.
8.—Steam stand.
9.—Pressure gauge.
10.—Booster lubricator.
11.—Shut-off valve.
12.—Flexible ball joints in steam piping.
13.—Booster engine.
14.—Exhaust injector pipe.
15.—Exhaust to blast pipe.
16.—Non-return valve in booster exhaust piping.
17.—Compressed-air reservoir.
18.—Compressed-air shut-off valve.
19.—Operating pilot valve.
20.—Rear pilot valve (reversing gear).
21.—Air distributing valve.
22.—Friction clutch operating cylinder.
23.—Disc clutch.
24.—Booster drain valve cylinder.
25.—Booster drain valves.
26.—Dog clutch operating cylinder.
27.—Dog clutch.
28.—Compressed-air gauge.
29.—Steam inlet gauge.
30.—Air distributing valve port.
31.—Auxiliary compressed-air cylinder.

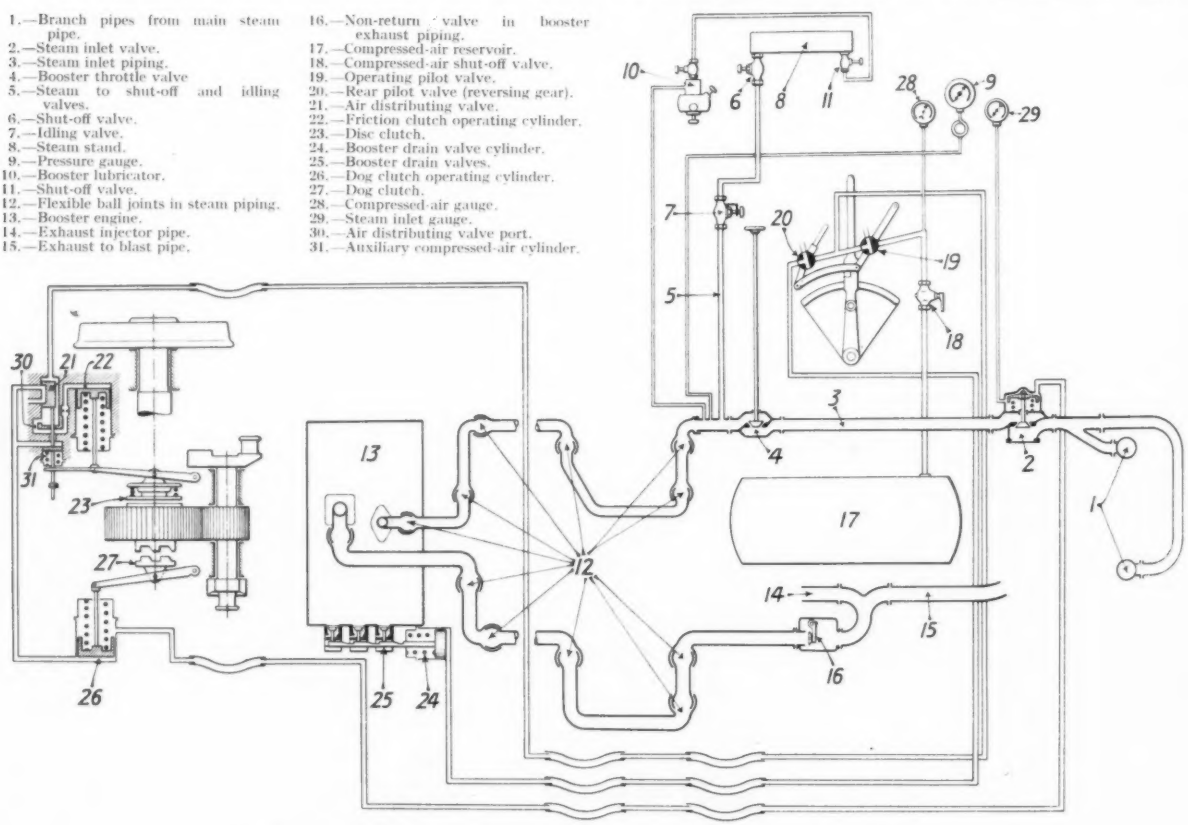


Fig. 1—Plan drawing showing arrangement of parts and connections

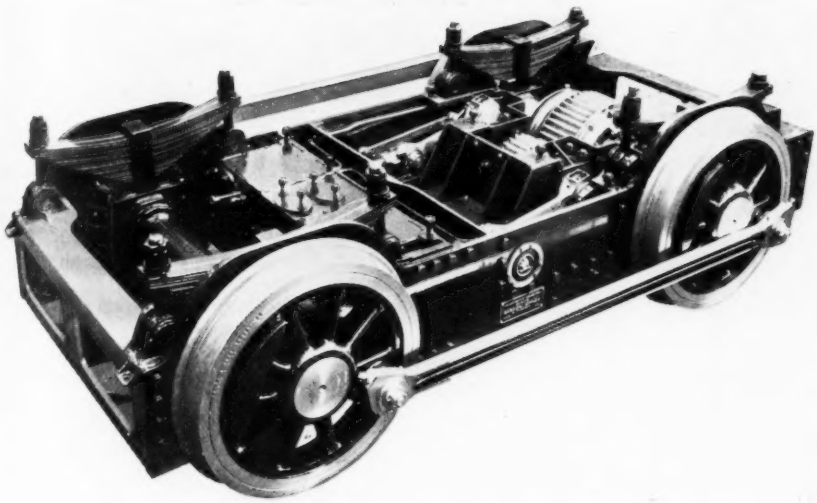


Fig. 2—General view of booster fitted bogie, casing removed

is a view of the booster-fitted bogie with casing removed, and Fig. 3 a 2-10-0 locomotive with booster-fitted tender.

The air for the booster operating gear is taken from the main locomotive air reservoir. As the booster steam cylinders are fed by steam from the locomotive steam pipes, the booster cannot work when steam to the locomotive cylinders is cut off. The superheated steam passes on its way to the booster cylinders through the automatic steam inlet valve and the hand operated booster throttle valve. Exhaust steam from the booster is led to the exhaust nozzle in the smokebox, or is used in the exhaust steam injector. The exhaust steam piping is provided with a non-return valve in order to prevent the locomotive exhaust steam required for the exhaust injector from entering the booster cylinders when these are out of operation.

A locking device prevents the booster from being started until the reversing lever has been set beyond a predetermined minimum cut-off for running forwards. When starting the booster, the shut-off valve at the steam stand of the booster is first opened. Thereupon the auxiliary saturated steam from the locomotive steam stand is admitted into the booster cylinders through the idler valve and the booster engine starts to run in neutral. The driver then puts the operating pilot valve into the position marked "Cut in." Compressed air now flows through the air-distributing valve into the disc clutch cylinder. The piston of this cylinder moves slowly forward, whereby the disc clutch is engaged by a device containing springs that allows for the engaging force to augment gradually. The value of this force depends upon the position of the engaging levers. As soon as the disc clutch is engaged, the speed of the booster engine becomes synchronised with that of the driving axle, and just before this happens, the air distributing valve is displaced so that air starts to flow into the dog clutch cylinder as well as into the auxiliary air distributing valve cylinder. At the same time the friction clutch cylinder slowly empties. If the teeth and gaps of the two dog clutch halves are in correct position the clutch engages at once. Compressed air is carried from the friction clutch cylinder to the air cylinder of the automatic steam inlet valve, which opens the steam passage to the booster.

If the teeth and gaps of the two dog clutch members are not in correct position, the clutch cannot engage until the air pressure in the friction clutch cylinder drops so far that the clutch cannot keep the speed of the engine synchronised with that of the driving axle. The result of this is a slight relative movement which enables the clutch to become engaged. When the booster has been working for about a minute, the driver opens the rear pilot valve of the reversing gear in order to close the booster drain valve. When the driver wishes to cut out the booster, he closes the front pilot valve simultaneously with the rear pilot valve, their handles being mechanically connected for this purpose. After the air valves have been changed over, compressed air escapes to the atmosphere through them from the piping of the automatic steam inlet valve, clutches and drain valves. The steam inlet will close, the clutches are released, and the drain valves are opened. When the cut-off in the locomotive cylinders is less than the predetermined minimum, the booster is automatically cut out.

The Skoda locomotive booster is claimed to possess several special advantages. The complete booster, including bogie frame, is sprung; the deadweights are limited to the wheel sets and the large gearwheel, so that the bogie runs even at high speeds without straining the track and the permanent way. The gearwheels are in constant mesh, so that the surface of the teeth cannot be damaged, and their contact is always correct. The clutches enable coupling and uncoupling to be done practically noiselessly at all speeds, and the steam engine cannot be damaged by shocks; it can be started smoothly even at high speeds. Moreover, the normal-gauge booster, including the wheel sets, weighs only 9,000 kg. (approx. 8 tons 17 cwt.), for a tractive force of 5,600 kg. (approx. 5 tons 10 cwt.).

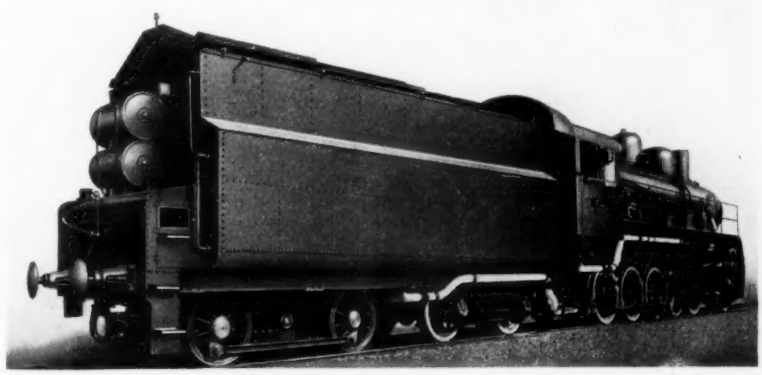


Fig. 3—A 2-10-0 type locomotive fitted with Skoda booster on trailing tender bogie

HIGH SPEED JUNCTIONS—II

By W. M. BOND

Application of two-level chairs to a typical junction

THE sketch plan, Fig. 6, shows a simple method of applying two-level chairs to a junction where one line curves from the straight, and indicates the principle by which as much as 3 in. of cant can be given to the curved road, retaining no cant on the straight. It represents a typical example of this type of junction, where there is a reasonably wide 6-ft. space and a straight length in the diamond. Less ideal conditions in no way depreciate the advantages of two-level design, but require scheming and some practice at this class of work before they can be two-levelled in the most efficient and economical manner. For ease of reference the straight road is assumed to be the main line and the curved or diverging road the branch, although in the actual junction the curved road may be as important as, or even more important than the straight.

The Layout

E/F switches are used with 1 in 16 crossings, leading into 1 in 12 switch diamonds. This is a situation where the future Long F or G switch referred to previously would have given a more ideal entry. The radius of the turnout curve is 37 ch. and with the proposed G switch the development of this radius would have been as follows:—

Angle of planing 1 in 95 or 100.
Radius up to heel chairs about 75 ch.
Radius through heel chair, 58 ch.
Radius through turnout curve, 37 ch.

As the most suitable switch available at the moment is the E/F, this had to be incorporated, giving the following divergencies:—

Angle of planing 1 in 80.
Radius up to heel chairs, 58 ch.
Radius through switch and turnout curves, 37 ch.

This radius continues through the crossing (except for the very short length of rigid straight through the point and splice rails of the crossing) to the last crossing chair. From this point to the heel of the diamond switches a transition is introduced bringing this curvature of 37 chains down to infinity.

The short length of straight through the crossing is at the moment unavoidable. It is wrong in principle, but as it need be only 5 ft. odd in length, it does not seriously upset the smooth passage of a train at high speed, although the author would certainly like to see more flexibility of materials introduced. A wider 6-ft. space or easier switch diamonds would have permitted the transition finishing, *i.e.*, developing into the straight, by the time the front (1 in 14) crossing had been reached, but in this particular example a flatter diamond was not possible. No detriment whatever is caused to the running by this overlap, especially as the cant introduced fully compensates for the curvature.

Cant

Consider first the down lines of the main and branch. The two-level P and heel chairs give a cant of 1 in. at the heel of the switch. These two-level chairs are in this instance used on one side only, and by raising the cess side switch rail in the down branch, give 1 in. of cant to this road whilst retaining no cant on the straight main. This switch rail having now climbed to 1 in. higher than normal, is further raised to 1½ in. by the use of A.S.1. chairs, T.13 to T.18. The rail continues at this higher level up to the crossing.

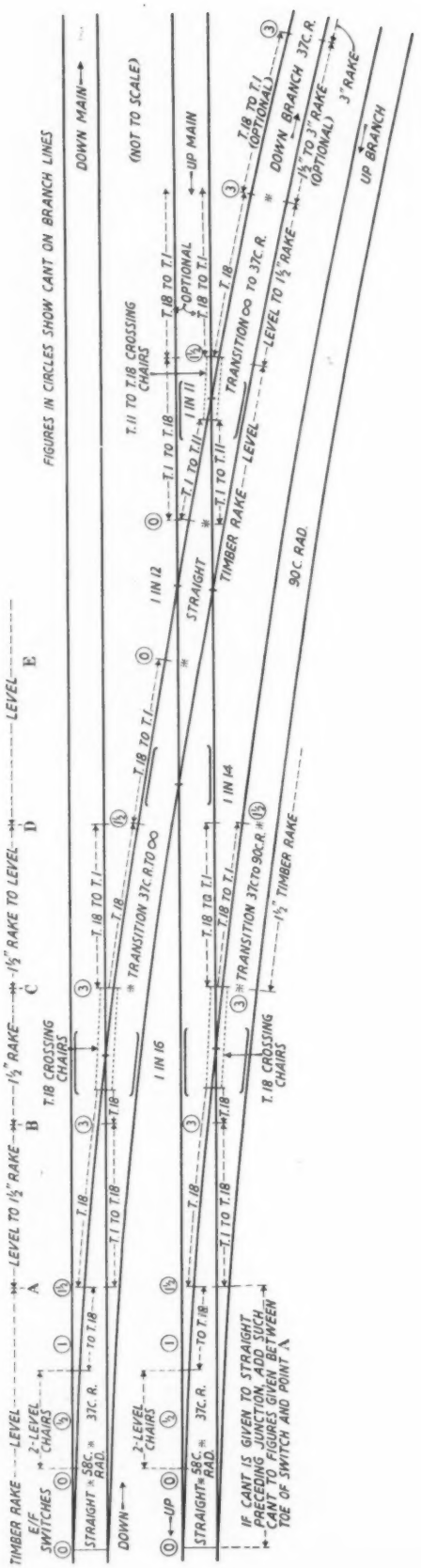


Fig. 6—Diagram of typical junction showing, by means of figures in circles, the cant at various points on the diverging lines, the main lines (straight) having no cant

It is apparent that the switch running rail of the main line must also rise to this higher level before the crossing is reached, and to do this, A.S.1 two-level chairs are introduced at point A immediately following the first T.18 in the branch line; it cannot be too strongly emphasised at this point, that the introduction of the two-level, or as they are sometimes called, " stepped " road chairs, into the switch running rail of the main line between points A and B, whilst bringing that rail up to a common level for the crossing, has the most important effect of continuing the cant gradient in the branch from $1\frac{1}{2}$ in. to 3 in. As the cess rail and 6-ft. rail of the main line on this length A to B are level (*i.e.*, no cant), the two-level chairs have the effect of progressively altering the rake of the timbers so that whilst at A they are level, giving $1\frac{1}{2}$ in. of cant to the branch and no cant to the straight, at B the timbers have a rake of $1\frac{1}{2}$ in. in 5 ft. and thereby give (coupled with the special chairs) 3 in. of cant to the branch and still no cant to the straight.

This will perhaps be more readily understood on reference to the illustration (Fig. 7) of a timber at this point, where the two switch running rails (the inside ones) are fitted into T.18 chairs, and the two stock rails fitted into normal chairs. The $1\frac{1}{2}$-in. timber rake negatives the lift of the right hand T.18, thereby retaining a " no cant " state in the main line whilst it doubles the lift of the left hand T.18, thus giving 3 in. cant to the curve or branch. In more difficult cases than the one quoted here, this feature of using two-level chairs to alter timber rake is used extensively. It can be applied either to increase or decrease the timber rake, or increase or decrease the cant, and, thirdly, by combining these two effects, cant can be increased or decreased whilst the rake is being changed. The more the author experiences the use of these chairs, the more varied their application seems to be.

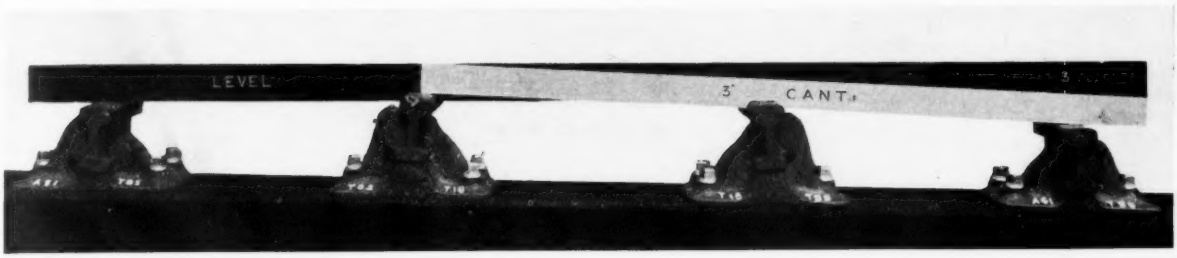


Fig. 7.—Both switch running rails fitted into T 18 chairs, and both stock rails in normal AS1 chairs. Timber rake $1\frac{1}{2}$ in., giving no cant to the straight and 3 in. cant to the curved (right hand) road

The crossing chairs are all T.18, *i.e.*, all have rail seatings $1\frac{1}{2}$ in. higher than normal, thus preserving the cant conditions obtained previously by the timber rake being continued at $1\frac{1}{2}$ in. In the length from C to E on the branch line, *i.e.*, from the crossing to the heel of the diamond switches, the curvature diminishes from 37 ch. to infinity and the cant requirements similarly diminish from 3 in. to 0. This reduction is effected by reducing the timber rake from $1\frac{1}{2}$ in. at C to level at D, using T.18's on the high rail throughout this length, and by stepping down the two-level chairs from T.18 to T.1 on the length from D to E, thus giving no cant at E where the transition enters the straight.

And so, with the exception of a deficiency of cant through the switch, it has been possible to cant the whole of the turnout up to the diamond, so as to leave little or no residual thrust, and furthermore, nothing has been given away on the straight in order to achieve this.

The deficiency through the switch in this example is due to two factors:—

(1) The ideal switch not being available at the moment.
(2) An inherent deficiency through the angle of planing.

Both these deficiencies can be eliminated, one by a new switch and the other by preceding the junction with some cant on the straight.

In actual practice, this preceding cant would be given to this layout. It has not been included here, as its inclusion would have made the example a little more difficult to follow. Assuming that $1\frac{1}{2}$ in. cant had been given to the straight at the toe of the switch, this sleeper rake would have merged into the present scheme at B, and at that point the straight main line would have been brought back to the no cant condition and the turnout of the branch from that point onwards would have had precisely the same cant as now.

The actual cant which in such circumstances would have obtained on the branch between the toe of the switch and this point B is seen by adding $1\frac{1}{2}$ in. to the cant figures shown on the plan. Additionally, it can be seen that with the adoption of the new Long F or G switch referred to previously, with its progressive curvatures, less cant would be required on the straight. If 1 in. of cant had been given to the straight preceding the switches, the length from A to B would still be the length over which the rake would change, but in this instance the change would be from 1 in. to $1\frac{1}{2}$ in. This would have been an example of timber rake and two-level chairs working in opposite directions and at different rates, the effect being a gentle cant " run out " on the straight from 1 in. to 0.

Now revert to the consideration of the method of dealing with the down main line beyond the crossing. From C to D the timber rake is changing from $1\frac{1}{2}$ in. to level, and on the same length and at the same rate the two-level chairs stepped from T.18 to T.1 exactly negative this effect and leave the straight with no cant throughout. It may be thought that all this extremely careful adjustment of cant, rake, &c., makes the proper maintenance of such a junction more than could reasonably be expected from the average ganger. In actual fact, all the cants, cant gradients, and changes in timber rakes are built into the job, so that there can be no mistakes and no excessive gradients if the straight is maintained with no cant. The ganger maintaining such a junction would merely have to keep his straight perfectly level, and the rest automatically adjusts itself. So not only has the difficult problem of canting junctions been partly solved, but the maintenance of such junctions has actually been simplified.

If the foregoing has been followed carefully, there should be no difficulty in understanding the application of two-levels beyond the diamond. In the up main, T.1S

to T.1 chairs have been shown as optional, as have those in the down branch line. In both these cases, as soon as sleepers have been reached no further two-level chairs are really necessary, as the first sleeper can take up the cant or carry on with the cant gradient. But this means that the sleeper bed will be at an appreciably different level from that of the last timber; some engineers prefer not to jump the beds in this manner, and the inclusion of more two-levels as indicated is for the purpose of bringing the sleepers gradually up to their required levels. It is not necessary to go into the details of two-levelling the up lines. It is similar to the down, and should be readily understood.

An interesting photograph is reproduced (Fig. 10) of a precisely similar lead lying in the makers' yard looking from the crossing into the trailing switch. The illustration clearly shows the level straight and the 3-in. cant on the curved road. The new and strengthened brackets of the built up A chair (T.18) are clearly seen, as is also the improved line of the turnout by the introduction of the E/F switch with a 1 in 16 crossing. On the extreme right a similar lead is seen fitted into the same chairs (T.18's) but with the timber rake adjusted to give 1 in. cant on the straight and 4 in. cant to the curve.

In the foregoing example the approximate values in speed with and without two-level chairs would be as follows:—

Without two-levelling
Straight: unrestricted.
Branch curve worth 35 m.p.h.
Probable speed restriction 30 m.p.h.
With two-levelling
Straight: unrestricted.
Branch curve worth 55 m.p.h.
Probable speed restriction, 50 m.p.h.

The Diamond

In the majority of junctions where there are no switch diamonds, and the standard obtuse crossings are fitted, the length between the turnout crossing and the obtuse angles is considerably shorter than the example taken; nevertheless, it is necessary in this length to introduce a transition, and if it is not possible to bring this transition down to infinity, it must on all occasions be used to reduce the curvature through the actual angles to the very minimum. It is also undesirable, for the purpose of fast running, to run the turnout curve over the 6-ft. space to terminate tangentially in a straight diamond. This has frequently been done in the past, and unfortunately is still being done, but it is now obvious that such methods are erroneous. Any change in radius, or perhaps more correctly, change in thrust, should be made only at such a rate as can be followed by a reasonable cant gradient, and thus it is undesirable to run the turnout curve through the 6-ft. and to end it instantly at a straight diamond.

Still worse is the junction which is designed with a sharp curvature running through one or both directions of the diamond, except of course if they are of similar flexure. Consider the three conditions which usually have to be dealt with:—

(1) Diamond resultant from junction of curves of similar flexure.
(2) Diamond resultant from curve off straight (as example).
(3) Diamond resultant from curves of contraflexure.

Case 1.—This is generally the simplest to deal with, the cant, of course, being favourable to both tracks. Such layouts need two-level chairs to provide the additional cant required for the inner curve. The actual cant to be given by rake of timbers at the obtuse angles is, as usual, arrived at by the consideration of the speeds of the two roads and their radii, and, where the cant necessity differs, fixing upon such a cant as will be neither excessive for one road nor unduly deficient for the other.

Case 2: *Curve off straight.*—If the diamond is on the curve throughout, then that curvature calls for some cant and, whatever cant is decided upon, it has to be given to the straight at the angles. This is why it is imperative that the curvature through the diamond should be reduced to the very minimum by the transition from the crossing. In cases where curvature persists through the diamond, necessitating cant, part or the whole of the cant imposed on the straight at this point is frequently carried right through from in advance of the switches to past the diamond.

Case 3: *Curves of contraflexure.*—Here again it is absolutely essential that the curvature of *both* roads shall be reduced to a minimum at the diamond, and having done all that is possible in this direction, such a cant is given to the main line as will not be unduly deficient for the branch. This frequently means that the subsidiary road must work at a deficiency in cant the whole way through.

The author has in mind an important junction on the L.M.S.R. which is being designed on this principle, namely, Colwich Junction. The main line, diverging to the left, has a radius of about 110 ch. and the subsidiary line to Stoke diverges to the right with a turnout radius of about 18 ch. These radii are transitioned down for the length through the diamond—the main line from 110 ch. to 170 ch., and the Stoke line from 18 ch. to 50 ch. The cant requirement at the diamond in favour of the main line is 1 in. and that amount of cant is to be given: thus there is a 1-in. negative cant to the Stoke line at this point. It should be noted that the allowable deficiency in cant is $2\frac{1}{4}$ in., and accepting this means that a curvature on the Stoke leg of the diamond can be developed up to that requiring $1\frac{1}{4}$ in. cant in itself, *i.e.*, 50 ch. Not only was this achieved, but by the use of two-level chairs, and by transitioning the changes in radii, this deficiency is maintained for the Stoke line as a constant throughout the junction. There being no deficiency at any point for the main line.

The result is that when this junction is relaid there will be a complete abolition of the present speed restriction on the main line, and additionally an easement in the speed restriction on the Stoke line. Thus there will be relief for both directions, and every permanent way man knows how difficult that is to attain without considerably altering an existing layout. Such betterment could be obtained only by the use of two-level chairs and continuously transitioning the lead by the Hallade methods, or alternatively by a very much easier layout which in this instance is impossible without moving a station and a road bridge. The present values of this junction are 60 m.p.h. for the main line and 20 m.p.h. for the Stoke line. On completion of the relaying these restrictions will be lifted to "No limit" on the main and 30 m.p.h. on the Stoke line.

The Case of Sharper Curvature

In case it should be thought that two-level chairs can be used only for easy layouts, where long leads and very flat diamonds obtain, a junction has just been completed at Barassie near Troon in Ayrshire (Figs. 8 and 9 opposite) where the diamond off the straight consists of: front crossing 1 in 9·5; obtuse crossing 1 in 8; back crossing 1 in 7; preceded by E/F switches with 1 in 12 crossings. This junction, before being relayed, was worth 20 m.p.h., and the speed restriction has now been lifted to 40 m.p.h. The severity of the curve is very noticeable, and in a layout of this type a speed restriction as high as 40 m.p.h. is a more difficult figure to aim at than a much higher figure on a more moderate curvature. As much as $2\frac{1}{2}$ in. of cant is given to the curve at the turnout crossing, there being $\frac{1}{2}$ in. of cant throughout the straights, except at the diamond, where this $\frac{1}{2}$ in. is increased to 1 in. This

Figs. 8 and 9—Barassie junction, L.M.S.R., as relaid with transitioned curves and two-level chairs, thus permitting of a higher speed on the diverging lines

cant was obtained by using up to T.12 chairs. It was not possible at this place to use T.18's as the length available for reduction to zero, necessary at the obtuse crossing, is too short; it was, however, possible to transition the radius of 18 ch. through the turnout down to approximately 45 ch. at the obtuse crossing thus keeping the cant deficiency at this point well within the $2\frac{1}{4}$ in. allowable.

One final aspect of two-level chairs, the importance of which is far greater than appears at first sight—a simple turnout off the back of a main line curve. The turnout itself may be almost negligible in its importance but all too frequently such a turnout causes a serious deficiency in the cant possible to the main line. By two-levelling such a lead to the full T.18 it is generally possible to eliminate the whole of this main line cant deficiency, and considerably to improve the running at this point. This practice of two-levelling simple leads from the back of curves is one which is growing rapidly on the L.M.S.R.

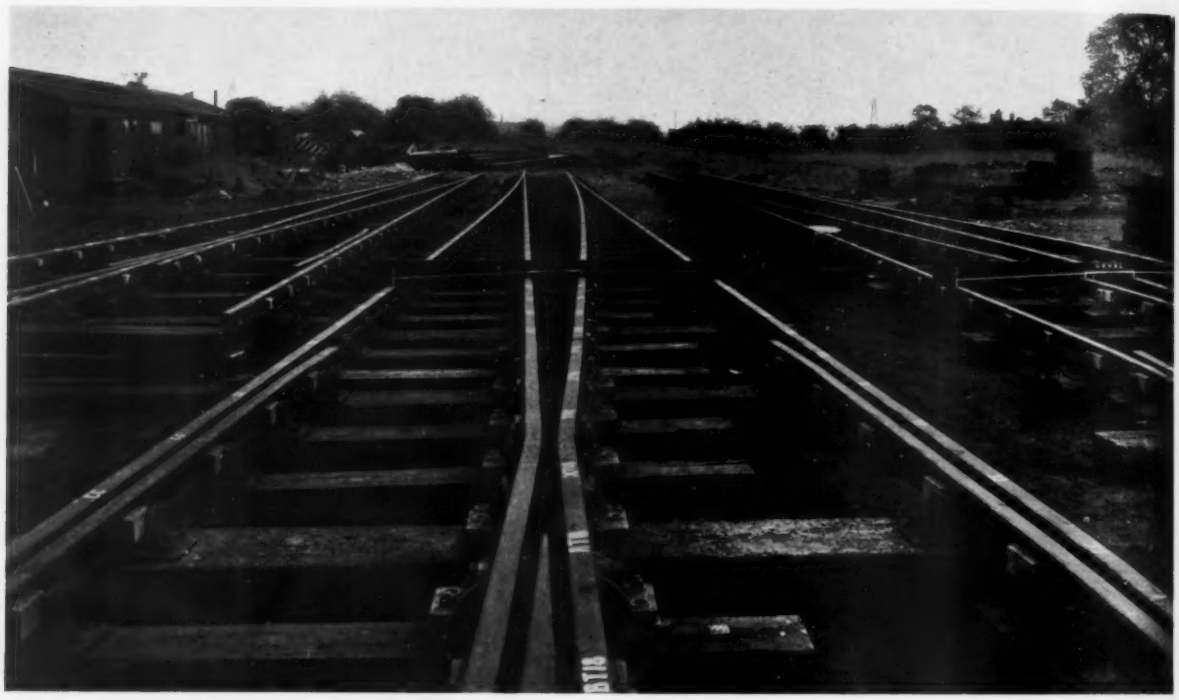


Fig. 10—Part layout in maker's yard looking from crossing towards switch and showing the level straight and the curved road canted 3 in.

The whole of the experimental work in connection with two-levels has been carried out on behalf of the L.M.S.R. by Taylor Bros. (Sandiacre) Ltd., Notts., to whom the author wishes to tender his thanks for the various photographs of two-level details reproduced. The manufacture of two-level junctions, turnouts, and all the ancillary details, calls for a rather higher standard of accuracy than usual. The correct set in the switch to ensure that all chairs give a proper bearing; the special care required in casting the new two-level and stepped road chairs; and the retention of correct gauge throughout a sharp and severe transition within the limits of the layout, are all points which call for precision work, a class of work this firm is well able to deal with.

It is the firm conviction of the author, and many others too, that the transitioned, two-level junction is a real advance over the standard. In the early days of this work it was deemed to be worth while if on the average 10 m.p.h. more could be obtained on any junction; this and more has been achieved, but it should not rest there. Much more can and should be done; the ideal of a perfect junction has been brought nearer but it certainly has not been reached yet. Switch design needs much improvement, curvature should be unbroken through crossings, and every radius throughout a junction should be developed transitionally. Along these lines, coupled with the further development of two-levels, will come the unrestricted junction.

In conclusion, the author would like to express his keen appreciation and thanks to the Chief Engineer of the L.M.S.R., Mr. W. K. Wallace, for the encouragement given, and the personal interest shown in the development of this type of junction, and to the Vice-President, Sir Harold Hartley, for his kind permission to publish this article.

THE NEW CHANNEL TRAIN FERRY SERVICE.—The Folkestone—Dunkerque cross-Channel service ran for the last time on Monday, October 5, when the ss. *Picard* made its final crossing. Although some of the buildings at the new train ferry dock at Dover (which we described last week) are not finished, the dock itself is complete, and the service with the train ferries between Dover and Dunkerque was begun on October 6. The first to leave Dover was the *Hampton Ferry*, on which passengers were accommodated; the through sleeping car service begins on October 14. From Dunkerque the first departure was the *Twickenham Ferry*, flying the French flag of the Soc. Anon. de Navigation Angleterre-Lorraine-Alsace. Both vessels conveyed through loaded goods wagons, and the *Twickenham Ferry* brought over (empty) four of the specially-constructed sleeping cars of the Wagons-Lits company; three of these are now on view at Victoria, Waterloo, and Cannon Street respectively.

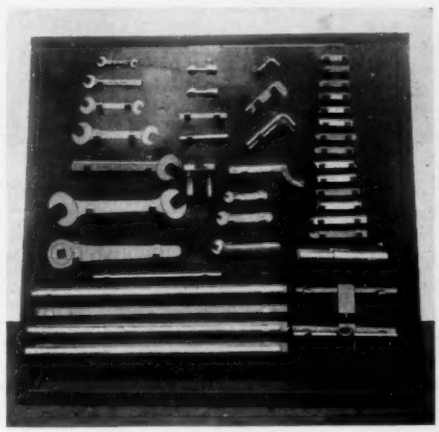
A LOCOMOTIVE MACHINE SHOP INNOVATION

New system of storing and identifying tools

IN the September issue of the *L.M.S. Magazine,* there appeared an article entitled " Shadow Board: A Place for everything and everything in its Place," contributed by the company's Chief Mechanical Engineer, and we are indebted to Mr. W. A. Stanier and the Editor of the magazine for permission to reproduce this article and the illustrations which accompanied it. The article dealt with one of the problems very common in railway workshops, namely that of keeping track of the numerous tools and other appliances used in the shops. It is highly necessary that a suitable method of storing them should be employed, otherwise inconvenience and a state of untidiness often arise, and delay is not infrequently caused by the fact that tools are mislaid. There are varying systems of storage in use, such as racks, containers, &c., but generally speaking no uniform system of storing and recording is in operation. In the Chief Mechanical Engineer's Department of the L.M.S.R., a scheme has recently been inaugurated which is appropriately termed the shadow board system. A painted representation of every tool is indicated on a board or steel plate, and when a tool is removed from its place, an outline or shadow is seen on the board or plate, indicating at a glance that this tool is in use. The tools are, of course, arranged according to their sizes and types, and each tool is held on the board over the appropriate " shadow " by a simple arrangement of clips or brackets.

This system might be defined by the time honoured maxim, " a place for everything and everything in its place," which is the primary object of the shadow board, but it also possesses other advantages over the old method of storing in racks and containers. The value and utility of such a board used in the maintenance section of a locomotive machine shop is obvious. There are approximately 300 various types of tools on the board, and in several instances in the illustration it will be noticed by the clearly defined white shadow that tools have been removed. From a maintenance point of view also, the shadow board has obvious advantages in that every tool can be inspected at a glance, and any slight defect easily detected before the tool has reached the worn-out stage, thus effecting an appreciable saving, and considerably facilitating supervision in this section. Moreover, it reduces the possibility of accidents due to defective tools and contributes largely to the safety first campaign which is now an essential feature of workshop practice.

The fact that a shadow or outline appears on the board proves that a corresponding tool is in existence, and thus duplication is reduced to a minimum. Under the old method, tools which could not be traced were often counted lost, and replacements made, thus resulting in duplication of stocks with consequent unnecessary expense. Shadow boards have a good psychological effect on the workmen due to the systematic manner in which they function. The general orderliness and neat appearance of the board induces the shop staff to take a certain amount of pride in seeing that tools are cleaned and in good working order before replacing them on the board.



Machine shop shadow board

In the inspection room it will be noted that the board is used for all gauges, and those shown on the photograph are the Wickman screw-thread caliper-type used for checking of component parts having external screw-threads. In addition to the shadow profile the corresponding sizes and limits are shown above. The advantages of ease in selection and replacement previously mentioned are obtained, and when used with the check system next described a quick method of locating any particular gauge is available.

The check system is a valuable asset when applied in a tool stores, or in departments where the issue and receipt of tools is controlled by a storesman. A disc, having a small hole and bearing the workman's clock number, is retained by the storesman as a receipt for a tool supplied, and when adopted in conjunction with the shadow system the check is hung on the board and takes the place of the

Shadow board in a locomotive machine shop

tool which has been removed. This affords a quick method of identifying the workman who is using the tool.

The shadow board can be almost universally applied to any plant, section or bench, as well as to machine tools. In the Chief Mechanical Engineer's Department, after its value had been proved on tools and gauges, it was extended to machine tools with equal success. It will be appreciated that each operator has a number of tools which he is using intermittently, and prior to the introduction of the shadow system, these tools, when not in use, were often placed on the bed or table of the machine or, in the case of a lathe, between the ways of the bed or other position which the operator considered convenient. In the case of an operator being changed, difficulty was often experienced in locating the tools used by the previous operator, thus causing inconvenience and loss of time. A new man can see at a glance the number and types of tools required for operating, which gives greater confidence in a machine which would obviously be strange in the initial stages. The introduction of the shadow board for machine tools has undoubtedly lessened this difficulty, as all the tools and also portable component parts connected with the machine are fixed on a shadow board which is placed in a convenient operating position adjacent to each machine. No check system is necessary in the case of shadow boards allocated to machines, as all the tools, &c., on the board are used only by the operator concerned, who automatically replaces them after use. The board, therefore, forms part of the complete machine unit in addition to showing the number and type of tools used for operating purposes on that machine.

Shadow board in the inspection room

M. & G.N. Joint Line Traffic

On October 1, in pursuance of the arrangements outlined in our issue of July 17, the management of the Midland & Great Northern Joint Railway was taken over by the L.N.E.R., the former Traffic Manager at King's Lynn, Mr. R. B. Walker, having retired at the end of September. On this page we reproduce the train service diagram of August 3, 1935, for the M. & G.N. main line between South Lynn and Great Yarmouth, whereon the volume of traffic handled at holiday periods is well shown. The large number of special trains arriving at Yarmouth in the early morning hours is indicative of the importance of the line in the working of long-distance day excursion and ordinary express trains between the Midlands and North and the East Anglian resorts. Manchester, Nottingham, Derby, Sheffield, Halifax, and Birmingham all enjoy through services to and from M. & G.N. Joint line stations. There are also through connections with London, the M. & G.N. route from Peterborough being used by the daily through coaches in each direction between King's Cross and Cromer. As well as handling a large volume of excursion traffic from other systems, the M. & G.N. itself has certain long-distance facilities of this type, through services being worked regularly from King's Lynn and Wisbech to King's Cross, and also to Leicester and Nottingham. (*Reference to L.M.S.R. and L.N.E.R. Joint Committee changes is made on page* **593**.)

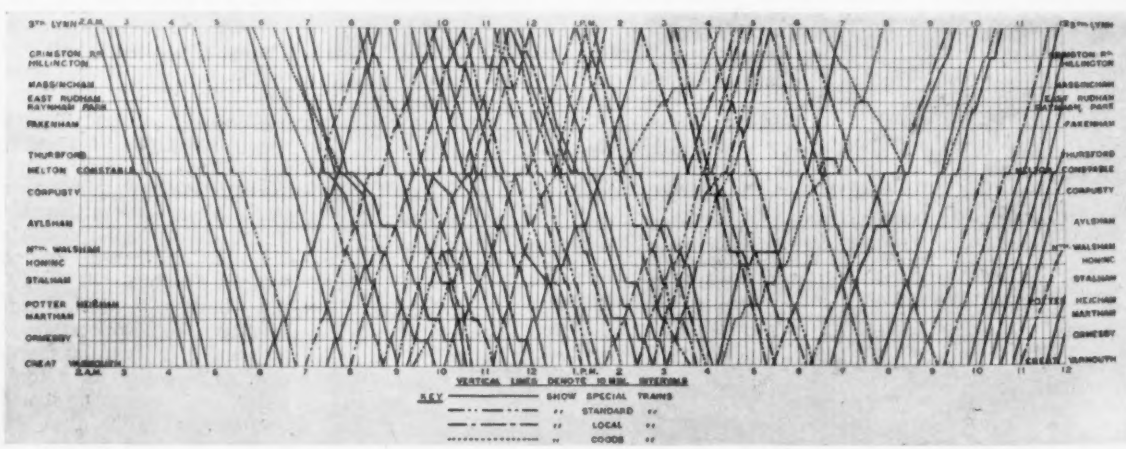
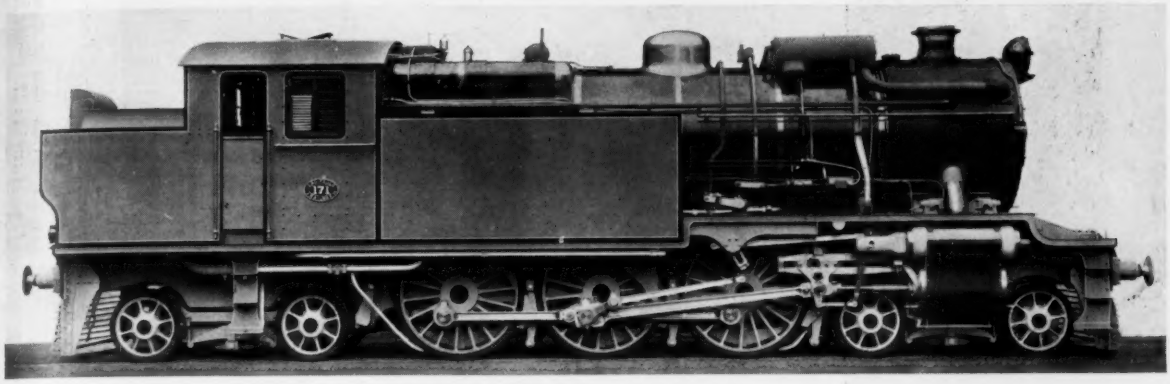


Diagram of train service between South Lynn and Great Yarmouth, Saturday, August 3, 1935

NEW TANK LOCOMOTIVES FOR BRAZIL

Built by the North British Locomotive Co. Ltd. for the San Paulo Railway



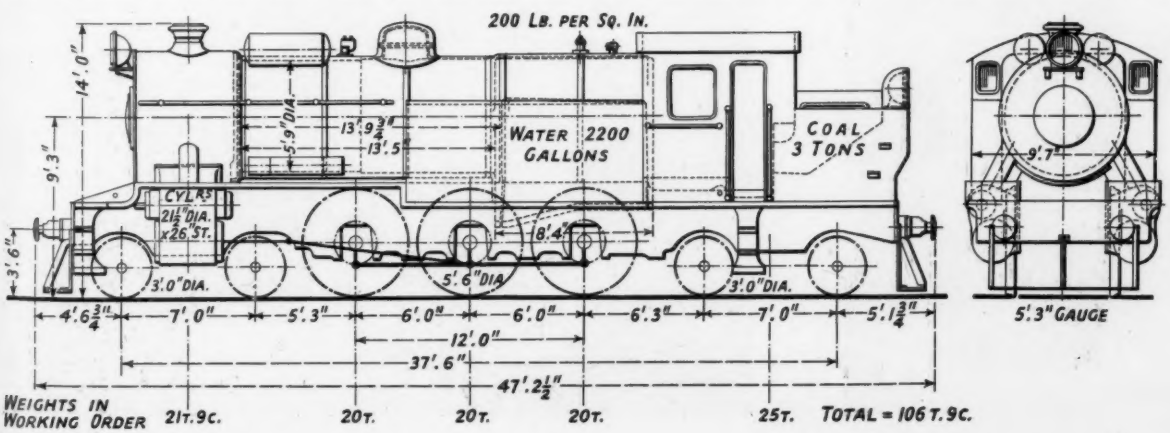
THE North British Locomotive Co. Ltd. has recently completed for the San Paulo Railway two 4-6-4 type tank locomotives designed for local passenger service. These were constructed in accordance with the requirements of the Chief Mechanical Engineer, Mr. P. C. Ford, and under the supervision of Messrs. Fox & Mayo, Consulting Engineers, London. Four additional locomotives, having the same characteristics, are now under construction in Glasgow.

The cylinders are placed outside the frames and steam distribution is effected by piston valves 11 in. in diameter, actuated by Walschaert valve gear; the latter is reversed by steam operated mechanism. The boiler is fitted with the Belpaire type of firebox, and the inner box is of copper. The dome is in two parts, base and body, each flanged from steel plate without weld, and the regulator fitted in the dome is of the North British Locomotive Company's single-beat type. The boiler barrel contains 128 ordinary tubes $2\frac{1}{8}$ in. diameter, and also 24 superheater flue tubes each $5\frac{1}{4}$ in. diameter. Five engines are provided with feed water heaters and one Nathan injector, and the sixth engine has two Nathan injectors.

The frames are constructed of plates $1\frac{1}{8}$ in. thick, well braced by cross stretchers of plating; the smokebox saddle is of cast steel. The slidebar brackets, motion girders and supports are of fabricated construction, and the tanks, cab, and bunker are also welded throughout. The coupled axleboxes are of cast steel with bronze bushes, and the axlebox guides are of cast steel, the right and left hand guides for the leading and driving wheels being cast together, thus acting as frame stretchers. The coupled springs are underhung, compensated throughout, and provided with auxiliary springs of rubber. The bogies are of the swing bolster type, with laminated bearing springs. Steam and hand brakes are applied to all the coupled wheels, and vacuum brake fittings are provided for actuating train brakes. Draft gear to suit central couplers is fitted, although at present the engines are equipped with side buffers and central draw hooks. The engines are fitted with Stone's electric lighting equipment. The leading particulars are as follow:—

Gauge of railway	5 ft. 3 in.
Cylinders (2), dia.	$21\frac{1}{8}$ in.
,, stroke	26 in.
Wheels, coupled, dia.	5 ft. 6 in.
,, bogie, dia.	3 ft. 0 in.
Working pressure	200 lb. per sq. in.
Heating surface :	
Tubes	1,435 sq. ft.
Firebox	165 ,,
Total	1,600 ,,
Superheater surface	430 ,,
Combined total	2,030 ,,
Grate area	28·5 sq. ft.
Tank capacity	2,200 gallons.
Fuel	3 tons coal

Items of equipment incorporated in the design of these engines are the A.C.F.I. feed water heater, Parry soot blowers, Lambert sanding apparatus, Whittaker water level indicator, Detroit lubricator and Ross safety valves.



Experimental articulated two-unit Pullman car in the U.S.A. (see editorial note on page 564)

***Above:** Reconstructed station at Bois Colombes, French State Railways. Note reinforced concrete construction including umbrella platform roofs. An article in our Electric Traction Supplement of July 24 described the French State Railways suburban electrified lines on which this station is situated.*
***Left:** Cable car approaching Gipfelstation, the upper terminus of the Austrian Zugspitz Railway, which is 2,805 metres (9,203 ft.) high*

RAILWAY NEWS SECTION

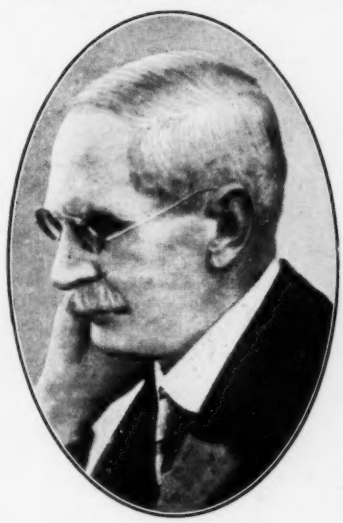
PERSONAL

Sir Josiah Stamp, Chairman and President of the Executive, L.M.S.R., has accepted an invitation from the Council of the Advertising Association to be President for the coming year, in succession to Sir Ernest Benn.

Mr. H. H. Swift, who, as announced in our issue of October 2, has been appointed Assistant Electrical Engineer, L.N.E.R., has for the past 16 years been with the English Electric Co. Ltd., since July, 1934, as Assistant Manager of the Traction Department of that firm. He obtained the degree of Bachelor of Engineering at Adelaide University, South Australia, and subsequently entered the Siemens-Schuckert works at Berlin; during the war he was interned as a civil prisoner of war at Ruhleben. In March, 1920, Mr. Swift joined the Electric Traction Department of the Dick Kerr works of the English Electric Company at Preston, and has subsequently represented that undertaking, first for 3½ years in Japan—in connection with contracts for electrification work on several Japanese railways—and then for 3 years in South Africa, with regard to the electrification of the Capetown-Simonstown line of the South African Railways. He has also made many visits to Denmark and Poland concerned with electrification contracts secured by the English Electric Company during the last few years, some of which are not yet completed.

Mr. H. H. Swift,
Appointed Assistant Electrical Engineer, L.N.E.R.

Mr. C. J. Boykett, who, as announced in our issue of July 10, is retiring from the position of Secretary to the Railways Commissioner, South Australia, has 49 years' public service to his credit, terminating in December, when his present leave prior to retirement expires. He has served in personal contact with every Commissioner there has been, first as Personal Clerk, then as Chief Clerk of the Department and Personal Clerk, and finally, since 1916, as Secretary. Born in North Adelaide in 1871, Mr. Boykett was educated at Whinham College and then for some time studied as a surveyor. In September, 1887, however, he entered the Audit Branch of the railways as a cadet, and two years later was transferred to the Commissioner's office. During the war he was appointed by the Commonwealth to special duty in connection with the engagement of war workers to go to Great Britain, and on its conclusion, the Prime Minister requested the Premier to express, on behalf of the Commonwealth, its appreciation of his services. Mr. Boykett has been a member of the Railways Appeal Board since 1916, and is an Honorary Lieutenant-Colonel in the Engineer and Railway Staff Corps of the Commonwealth Forces. He is a member of the committee of the St. John Ambulance Association and was at one time well known in Adelaide musical circles. In addition to his unfailing courtesy and tact, Mr. Boykett's work in the settlement of financial differences between Victoria and South Australia in connection with border railways will long be remembered.



Mr. C. J. Boykett,
Secretary to the Railways Commissioner, South Australia, 1916-36

At a farewell gathering, when Mr. Boykett was presented by his colleagues with an inscribed tankard and travelling rug, Mr. Anderson, the Commissioner, expressed regret at his retirement and acknowledgment of his deep debt of gratitude to him for his work. On behalf of the Railway Service he extended to him best wishes for his future. Mr. A. J. Hannam, K.C., Solicitor for Railways, also spoke and made the presentation, with the words: "as an expression of our sincere appreciation of the many kindnesses you have shown us."

Mr. F. C. W. Christison,
Appointed Secretary to the South Australian Railways Commissioner

Mr. F. C. W. Christison, who, as announced in THE RAILWAY GAZETTE of July 10, has been appointed to succeed Mr. C. J. Boykett as Secretary to the South Australian Railways Commissioner, was educated at Adelaide Collegiate School (subsequently merged into Queen's College). He entered the office of the Traffic Auditor, S.A.R., in August, 1891, and remained there until transferred to the Railways Commissioner's office in November, 1895. He has continued to fill various positions in that office throughout the remaining period of his service, these culminating in his appointment as Chief Clerk in November, 1925, and now Secretary. Of his 45 years' service, therefore, 41 have been spent in the Commissioner's office under Messrs. Pendleton, Moncrieff, McGuire, Webb and Anderson, who has been Commissioner since 1930.

Mr. Edwin C. Cox, C.B.E., M.V.O., T.D., who, as announced in our issue of July 31, is retiring tomorrow from the position of Traffic Manager of the Southern Railway, joined the South Eastern Railway in 1883, and after three years' training, was transferred to the office of the Outdoor Superintendent, where he gained experience in every branch of traffic work. In 1902 he was appointed Assistant Indoor Superintendent of the combined South Eastern and Chatham system. During the South African war he was responsible for the heavy military traffic that passed over the railway. He was appointed Assistant Superintendent of the Line in 1910, and Superintendent of the Line in 1911, when at 43 he ranked as the youngest railway superintendent in the kingdom. From 1902 to 1911 Mr. Cox was Chairman of the S.E. & C.R. St. John Ambulance Centre, and, on relinquishing this position when appointed Superintendent of the Line, was accorded a vote of thanks—for distinguished services rendered in furtherance of the work—by H.R.H. the Grand Prior and the Chapter General of the Order. He was also a member of the committee of railway and Government department representatives appointed to control the supply of wagons for Government traffic from 1915 to 1919, and was deputed to assist the Railway Executive Committee in dealing with matters connected with the railway transport of troops, munitions, &c., in this country. From March, 1919, to the end of 1920, and again in 1926, 1931, and 1935, Mr. Cox was Chairman of the Railway Clearing House Superintendents' Conference. During the former period he was, in addition, Chairman of seven different committees appointed to negotiate with the trades unions the standard rates of pay and conditions of service of the traffic staff in the conciliation grades of the railways throughout the country, also of stationmasters, controllers, men and women clerks, &c., and the standardisation of nomenclature for grades in the Traffic, Goods, Locomotive, and Engineering Departments. Since then he has been a member of the panel of railway officers on the National Wages Board. Mr. Cox was a member of the committee appointed in October, 1920, by the Minister of Transport to consider and report upon the question of automatic train control. He gave evidence, on behalf of the railway companies, before the Rates Advisory Committee in respect to passenger fares, season-ticket rates, workmen's fares, and miscellaneous traffic by passenger train, prior to the interim revision of rates and charges that came into force in August, 1920, and also before the Railway Rates Tribunal in connection with workmen's fares; he is also one of the auxiliary members of the tribunal panel to be called in for special service thereon as may be required. Since the inauguration of the London Passenger Transport Board Mr. Cox has been a member of the Traffic Advisory Committee and the Fares and Services Committee. On the formation of the Southern Railway in 1923, Mr. Cox was appointed Chief Operating Superintendent of the group, and on March 31, 1930, became Traffic Manager, the position from which he now retires. He holds the rank of Lieutenant-Colonel in the Engineer and Railway Staff Corps with distinguished medal, is a Foundation Member of the Institute of Transport and a Member of Council at the present time. He was awarded the gold medal of the Institute of Transport, 1928, for his paper on "Electrification of the Southern Railway." Among the honours conferred upon Mr. Cox are: Commander of the Order of the British Empire (1918); Member of the Victorian Order (1926); Honorary Associate of the Order of the Hospital of St. John of Jerusalem (1920); Chevalier de l'ordre National de la Legion d'honneur (1927); Officer de l'ordre de Leopold (1934), and a Chevalier of this order from 1918; Officer of the Crown of Roumania (1924); and Order of the Nile (1928). In June, 1934, Mr. Cox was received in audience with other British railway officers by the King of the Belgians.

Photo by [*Lafayette*

Mr. Edwin C. Cox, C.B.E., M.V.O., T.D.,

Traffic Manager, Southern Railway, who is retiring on October 10

At the funeral of Sir Brodie Henderson, which, as we mentioned last week, took place on October 1 at Braughing, there were present—in addition to family mourners—the following:—

Sir Eastman Bell, Messrs. R. Booth (General Manager, Messrs. Livesey & Henderson), A. J. Boyd, W. Codrington, G. Cocollis (Asst., Sec., Central Argentine Railway), E. G. Clark (Secretary and representing Institution of Civil Engineers), B. D. F. Docker, F. D. Docker, W. H. Drewry (and representing Central Argentine Railway), N. B. Dickson, J. M. Eddy, H. E. Edwards (and representing United Steel Co.), F. O. Ellis (and representing Great Western of Brazil Railway), N. F. E. Grey (Sec., B.A.G.S. and B.A.W. Railways), R. Graham (Sec. London Committee, British-Argentine Railways), Sir Follett Holt, Messrs. F. C. Hunt (Metropolitan-Vickers Electrical Export Co.), R. Leslie (Sec. and London Manager, C.A.F.), H. J. S. Moyses (Birmingham Railway Carriage & Wagon Co.), C. H. Pearson, W. W. Parish, R. Pooley (Shelton Iron, Steel & Coal Co.), C. Redford Salmon (Sir G. W. Armstrong-Whitworth & Co.), T. L. Taylor, G. W. Teague, and H. O. Tubby (Sec., Central Uruguay Railway).

The Memorial Service, on October 2, at St. Michael's, Cornhill, was attended by members of the family, and by:—

Sir Frank M. Baddeley, Messrs. A. W. Bolden, R. Booth (General Manager, Messrs. Livesey & Henderson), T. D. Brotherton (General Electric Co.), G. Cocollis (Asst. Sec., C.A.R.), C. Cowley (Sec., Antofagasta (Chili) & Bolivia Railway), W. Codrington (Chairman, also representing Nyasaland Railways), J. Dolby (Central Uruguay Railway), V. D. Fay (representing Sir Sam Fay), Maj.-Gen. Sir Evan Gibb (representing Sir Alexander Gibb), Sir Nigel Gresley, Mr. P. D. Greville (Antofagasta (Chili) & Bolivia Railway), Sir Follett Holt, Lt.-Col. R. Tristram Harper, Messrs. W. Howard Williams, A. G. Hunt, F. J. Hills (London Manager, Metropolitan-Cammell Carriage &

Wagon Co.), H. A. A. Hicks (Sec., Leopoldina Railway), Sir Cyril Kirkpatrick, Sir G. E. Leguizamon, Messrs. J. S. Lewis (representing Midland Railway of Western Australia), E. Lawrence (Dorman Long & Co.), W. J. Maslem (Sec., United Railways of Havana), Col. A. H. L. Mount, Messrs. A. J. Medlycott (Great Western of Brazil Railway), H. E. Owen (representing North Western Railway of Uruguay), Lt.-Col. Woodbine Parish, Messrs. S. J. Payne (B.A.G.S. & W.R.), C. H. Pearson, Lord Plender, Messrs. T. Potter (London Manager, Gloucester Railway Carriage & Wagon Co.), S. G. Redman (Messrs. Merz & McLellan), Eric Robinson, C. P. Sandberg, O. F. A. Sandberg, N. Stuart (Sec., Cordoba Central Railway), N. B. Stuart (Hurst Nelson & Co.), Sir Seymour Tritton (Messrs. Rendel Palmer & Tritton), and R. Thornycroft (representing Sir John Thornycroft.

The Secretary of State for the Colonies has recently appointed Mr. W. L. Tinworth, Deputy Chief Accountant Tanganyika Government Railways, to be Personal Assistant to the General Manager of that system.

Mr. Arthur Cunnington, Assistant to the Chief Engineer, Southern Railway, for Lighting, Heating and Water, has been elected President of the Illuminating Engineering Society for the new secession, and will deliver his presidential address at the society's opening meeting at the Lighting Service Bureau, 2, Savoy Hill, London, W.C.2, on Tuesday, October 13, at 5.30 p.m.

From the *London Gazette* of October 2: Regular Army Reserve of Officers; Royal Engineers, Transportation:—Lt.-Col. and Brevet Col. H. S. Cole, from Supplementary Reserve of Officers, R.E. (Transportation), to be Lt.-Col. and Brevet Col. (October 1), retaining his present seniority. Col. Cole is Chief of Police, North Eastern and Scottish Areas, L.N.E.R.

Mr. James McLaren has been appointed Secretary of the Midland & Great Northern Railways Joint Committee and the Norfolk & Suffolk Joint Railways Committee. This became effective on October 1, when the L.N.E.R. assumed responsibility for the management of these undertakings. Consequential changes in the constitution of the L.M.S.R. and L.N.E.R. Joint Committees are recorded on page 593.

We regret to announce the death, on October 6, of Mr. Walter Home, C.I.E., K.I.H. Gold Medal, the last Chairman and Managing Director of the Burma Railways Company. Mr. Home, who was over 80 years of age, having been born in December, 1855, was trained at the Royal Indian Engineering College, Coopers Hill, in its early days. He was appointed as an Assistant Engineer in the Railway Branch of the Indian Public Works Department in 1877, and four years later his services were lent to the Jodhpore Durbar; he was subsequently Manager of the Jodhpur Bikaner Railway for 15 years. He retired in 1906 and was elected first Managing Director, and later (in 1921) Chairman, in addition, of the Burma Railways Company, the position he held at the time Government again took over the working of the Burma Railways system on January 1, 1929, when he retired. Mr. Home was awarded the Kaiser-i-Hind Gold Medal for conspicuous work in combatting the great famine about 1900 and was decorated with the C.I.E. in 1904.

L.N.E.R. Appointments

The London & North Eastern Railway announces the following appointments:—

Mr. E. M. Rutter, Portmaster, Grimsby, to be Passenger Manager, North Eastern Area, York, in succession to Mr. S. T. Burgoyne, who has recently been appointed Superintendent of that area.

Mr. H. J. Birkbeck, Deputy Chief Rates Clerk, Goods Manager's office, King's Cross, to be District Goods & Passenger Manager, Peterborough, in succession to Mr. H. S. Owen, who has recently been appointed District Goods Manager, Manchester.

Indian Railway Staff Changes

Mr. J. A. Bell, officiating Agent, East Indian Railway, has been confirmed in that appointment as from January 21 last.

Mr. P. K. Sarkar has been appointed to officiate as Deputy Chief Acounts Officer, E.B.R., as from August 22.

Lt.-Col. R. E. Gordon, M.C., R.E., Deputy Agent (Organisation), N.W.R., has been appointed to officiate as Divisional Superintendent, Ferozepur.

Mr. F. V. Mahony has been appointed to officiate as Controller of Stores, N.W.R., as from August 17.

Col. J. Holthouse, Officer Commanding the Aircraft and Artillery depot at Roberts Heights, has been appointed Manager of the South African Airways in succession to Mr. G. J. A. Lindenberg, recently appointed as Mechanical Engineer at Durban. Col. Holthouse has been in the South African Air Force for 17 years and he is one of the pioneers of flying in the Sub-Continent. He joined the Royal Flying Corps in 1915, and played a leading part in the development of the South African Air Force, doing most of the early pioneer flying from 1919 to 1922. Col. Holthouse was the first officer to be employed by the Union Government as a flying officer, and he and Brigadier-General Sir Pierre van Ryneveld were the first two pilots in South Africa. In addition to a distinguished war career and the prominent part played by him in the building up of the present South African Air Force, he has always taken a keen interest in civil aviation. He was Director of Civil Aviation from 1933 to 1934 and is still a member of the Civil Air Board. He was a member of the Cape to Cairo aerial survey party in 1919, and his remarkable technical knowledge is generally recognised.

Proposed Renewal of Road Service A Licences

Opposition by railway companies to the Bouts-Tillotson application

Mr. Gleeson Robinson, Traffic Commissioner for the Metropolitan Area and Licensing Authority for the London Traffic Area, in the course of the proceedings on these applications, heard evidence on October 1 of investigations into complaints made at previous hearings of late deliveries by rail. Mr. A. S. Mills, G.W.R., spoke of one consignment for a Welsh destination which went astray and was lost because of bad labelling by the consignors. Mr. W. G. Crowhurst, Southern Railway, spoke of alleged delay in deliveries at Southampton, apparently from London. In one case Victoria was found not to be Victoria in London, but Victoria Bridge on the Great Northern Railway (Ireland). In 75 out of 107 cases Sunday was included in the transit time, and in ten cases the Whitsuntide holiday intervened as well. Mr. F. C. Stanley, L.N.E.R., said that in one case, because of a misreading, a consignment for Edenbridge was sent to Edinburgh.

Mr. Maxwell Fyfe, K.C., addressing the Commissioner on behalf of the railway companies, said that this was a matter of very great importance to the transport industry. Wasteful competition was not in the interests of the public generally or of the providers or users of transport. Excess of suitable facilities meant wasteful competition. The answer to the question of hardship to the applicants was that they had extended their business with the knowledge that the position might alter at the end of two years. It had been suggested that the railway companies were trying to substitute monopoly for controlled competition. They were only, in effect, allowed to succeed in their objects on the basis that they were providing adequate services. That in his submission was no monopoly; it was a position in which there was the severest sanction against inefficiency. The hearing was adjourned until Saturday, October 3.

Mr. E. S. Herbert, for the applicants, submitted that the general question of confiscation was an issue in this case.

Mr. Gleeson Robinson: The Act has said that the licence is not a property, and if I refuse a licence I am not confiscating any property.

Mr. Herbert contended that the fact that the railways could carry more traffic than they were carrying now was not sufficient excuse for refusing the applicants' licence as that would deprive traders and merchants of freedom of choice for their transport. The applicants had proved the need for the services by showing the extent to which they had been used.

The hearing was concluded on October 3, and Mr. Gleeson Robinson reserved his decision.

XUM

Some Aspects of Railway Finance

Extracts from an address by Mr. W. V. Wood, Vice-President, L.M.S.R., to the Bristol and District Section of the Institute of Transport

British railway financial information is unique in its published detail. The exceptional mass of material supplied in the statutory accounts of the railways and by the chairmen of the companies at the annual meetings, together with the four-weekly and annual statistics published by the Ministry of Transport and the further working details furnished to the Railway Rates Tribunal at the annual reviews, provide more statistical and financial details than are published by any other industry. Railways were built under private Acts of Parliament, and these Acts and the general Acts incorporated with them take the place of an ordinary company's memorandum and articles of association. The four amalgamated companies were, however, created by the Railways Act of 1921, under which a special tribunal was set up to confirm schemes of amalgamation submitted by the parties to each group, or to prepare and settle schemes where the parties failed to submit agreed proposals. From January 1, 1923, the four companies were created by Orders of this tribunal, which had the force of Acts of Parliament, and took over the properties of the old companies mainly in consideration for stocks of the new companies as set out in the Orders, though in a few minor cases cash payments were made. Many interesting points concerning the financial arrangements of the companies are covered by these Orders. The Great Western Order differs from the others because that company was continued and the companies amalgamated with it were merged in its existing financial structure.

"Profits" or net revenue (the term used in the Railways Act of 1921) in the railway sense can perhaps best be described as the money available on the year's working for interest and dividend on both debenture and share capital, but in the accounts of an ordinary company it generally means the amount available for dividends on shares after meeting the interest on debentures. The Railway Companies (Accounts and Returns) Act, 1911, provides in detail how the results of a year's working are to be ascertained. The chief working account (No. 8) relates to the "revenue receipts and expenditure of the whole undertaking," and the total of this account is described as the "net revenue of the year." Taking the four companies together the 1935 results showed:—

	Millions
Net revenue	£32·9
Brought forward and special items	£1·2
Available for interest and dividend	£34·1

and this was applied:—

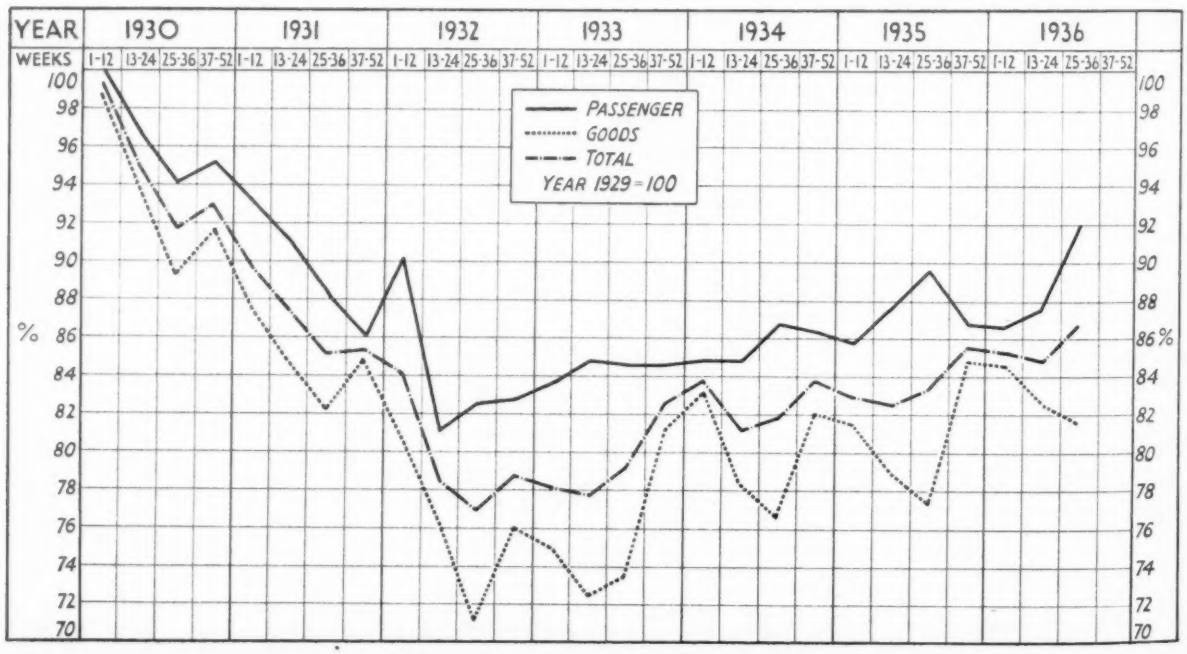
Interest on debenture stocks	£12·3
Dividend on rent charge, guaranteed, and preference stocks	£18·7
Dividend on ordinary stocks	£2·7
Carried forward	£0·4
	£34·1

The basis of the standard revenue settled by the Railway Rates Tribunal was the net revenue of the year 1913, together with certain allowances mainly for fructification of capital which was not fully reflected in the 1913 figures. The amounts of the standard revenue aimed at, including allowances for additional capital raised or provided, are:—

	Millions
L.M.S.R.	£20·6
L.N.E.R.	£15·2
G.W.R.	£8·4
S.R.	£7·1
	£51·3

There was no guarantee that these amounts would be realised and in fact the standards have not so far been reached, the aggregate net revenues of the four companies having varied from £45 millions in 1929 to £26·4 millions in 1932. The £51·3 millions is, however, the net revenue which Parliament considered the railways are entitled to earn and there is no reason why in the course of time this level should not be attained. There has been substantial recovery from the lowest point and if the 1929 gross earnings were reached, with retention of only a third of the reductions in annual expenditure since then, the standard would be about reached and represent an earning of nearly 4·7 per cent. on the capital receipts of the companies.

A railway company's accounts are not prepared on a cash basis and it is only by a rare accident that the expenditure charged means the cash outlay in a year. There is a fairly steady expenditure on repairs and partial renewals and this is charged currently as it is spent, an exception being when for some special reason a substantial



Traffic receipts (passenger, goods, and total) of the four main-line railways for the years 1930 *to* 1936, *standardised on* 1929

block of repairs is postponed. On the other hand, complete renewals, particularly of rolling stock and permanent way, fall in irregularly and these are charged annually on a "provision" basis, representing the average probable outlay, regardless of the actual outlay in a year. On the L.N.E.R., however, actual renewals are performed as required in the usual manner, but are charged to revenue currently.

These provisions are based on replacement cost as distinct from first cost. Credits to capital for assets displaced and not replaced since 1924 total £25 million for the four companies

Since amalgamation the L.M.S.R. has undertaken new physical works representing an outlay of some £133 millions. Every scheme for a new work has to be judged by the test of its earning power in terms of net revenue. There are works designed to improve existing sources of gross revenue or to create others by the improvement of traffic earning facilities. Then there are those which are necessary merely to maintain and protect gross revenue in the process of keeping abreast of the times, such as the natural evolution of carriage amenities. Other classes of works are aimed at enabling the companies to earn the existing gross revenue with less expenditure than before, and examples are improved methods of signalling and improved design of locomotives. It is very rarely that a simple renewal takes place. No project is regarded as profitable if it does not show a reasonably clear margin after allowing for the interest and other charges.

Between 1922 and 1935 the four companies effected a reduction in working expenses of no less than £45,000,000. This includes reductions due to price changes and output as well as true economies and against it must be set the interest charges incurred on capital expenditure to secure it. As a result of its locomotive policy the L.M.S.R. is working today with a reduction of 24 per cent. in the total number of locomotives compared with the time of grouping, which is in itself a striking example of the saving effected. By reducing the number of types, reorganising the workshops and repair sheds, obtaining longer runs between shoppings for repairs, improving the running shed arrangements and introducing locomotives of new designs, the company has secured a clear economy of £2,000,000 per annum apart altogether from changes in prices and quantity of work. This result—a striking example of what all the companies are doing in various directions—fully justifies the close investigation and supervision which led to it.

To eliminate unnecessary work should be an object of any business man but that applies with the greatest of force to a railway, because it is a business selling not a commodity but a series of services, and therefore an individual is apt to do something because it is customary and is not capable of being clearly connected by him with a particular service for which he is responsible. The system of budgetary control introduced by the L.M.S.R. a few years ago may be defined as a means of controlling and rationing working expenditure. Its object is to forecast revenue and expenditure and let each unit in the organisation—on both the selling and spending sides—know what is expected of it well in advance. Towards the end of each year each chief officer submits his estimate of expenditure under each type of work for the ensuing year, together with such physical data as are appropriate in support of his estimate. Approval of the budget, as settled, permits each department to arrange its services and programme of work well in advance of spending and break its expenditure down into areas, types and periods of the year.

Budgetary control has been found to be an invaluable aid in rationing the available money on its merits. It is not a mere expenditure cutting arrangement and, in fact, in directions so varied as signalling, particular features of road motor maintenance, particular features of advertising arrangements and mechanical appliances for office work, increased expenditure has been authorised as a matter of central policy, while in other directions there have been considerable curtailments.

In the weekly statements of traffic receipts the margin of error in any week is rarely 1 per cent. On the L.M.S.R. the error in the 52 weeks of 1935 was the small one of 0·3 per cent. The variations, one week with another, are due to national and local holidays, large conferences, and other events which do not fall in the same week each year. The most obvious variation follows from the 35 possible alternative dates of Easter and its sequence Whitsunday, and in order to get a true comparison over a series of years of the traffic affected by these holidays alone, it is necessary to allow not only for this but for the fact that an early Easter will produce less traffic than a late one. There is the further complication that each year includes one or, in Leap year, two odd days. This not only makes a year's total differ from the 52 weeks' total, but means that no calendar week represents the same conditions as in the corresponding week of the previous year. This is most noticeable around Christmas, as a week in which it follows, say, on a Tuesday, will have lower receipts than in one in which it falls on a Wednesday, as in the former case the previous week will include more seasonal traffic, particularly passengers and parcels, to the detriment of Christmas week.

Four-weekly figures are of much more value than weekly figures, because they flatten out many of the temporary disparities, and over a series of years the 52 weeks divided into groups of 12, 12, 12 and 16 weeks give a comparison which avoids calendar variations. The accompanying graph illustrates this. It breaks the receipts of the four companies for the years 1930 to 1935 and part of 1936 into the four periods, showing them as percentages of 1929, and separates passenger and goods train traffics. 1929 is the most suitable recent base, as the effect of the trade depression began to be felt by the railways about the end of February, 1930.

BEST KEPT STATION COMPETITIONS, 1936.—Special class awards have been made in the L.N.E.R. Best Kept Station Competitions for 1936 to the following stations in the Southern Area: Elsenham, Saughall, and Leadenham. Twenty-five stations received first class awards, 20 stations second class, 46 stations third class, and 76 stations fourth class, and 24 stations were awarded certificates of commendation. In the North Eastern Area, special class awards were made to Cherry Burton, Heddon-on-the-Wall, and Wharram. Seventeen stations received first class awards, 21 stations second class, 40 stations third class, and 119 fourth class, and, in addition, 16 stations were awarded certificates of commendation.

POOLING FACILITIES IN CANADA.—Mr. Arthur E. Cavanagh, General Manager of the Temiskaming & Northern Ontario Railway, recently announced that amalgamation of shop, car, and yard facilities of the T. & N.O. and the Canadian National Railways at Cochrane, Ontario, was under consideration, and although this consolidation had not been definitely decided upon, preliminary work in connection with the proposal had actually been undertaken. Reports gaining currency in Cochrane assumed that the T. & N.O. employees concerned would be absorbed by the C.N.R. service, but that 30 or 40 men would be displaced. The T. & N.O. shops at Cochrane have an annual payroll of $18,000.

GERMAN ROAD DEVELOPMENT.—Up to the present time, no fewer than 52,000,000 days of employment have been given to workmen engaged on building the national motor roads in the Reich, stated Dr. Todt, Inspector-General of the German Roadways, at the Road Construction Exhibition at Munich. Before the end of September, he said, the 94-mile stretch of road between Berlin and the Baltic seaport of Stettin will be opened and 625 miles of motor road will have been completed. A further 940 miles of roadway are under construction in various parts of the country—in Silesia, Rhineland, and Central and South West Germany. The Berlin-Stettin *autobahn* is one of the roads authorised under the original scheme authorised prior to August, 1934, details and a map of which were published in our issue of June 7, 1935.

XUM

The Longest British Non-Stop Runs

In the annexed table is given a list of the daily non-stop runs in Great Britain exceeding 200 miles in length, taken from the 1936 summer timetables. As compared with 1935, two runs which are now missing are the Paddington—Plymouth journeys of the Cornish Riviera Limited, G.W.R. The train now stops at Newton Abbot (193·9 miles) in each direction, in order to attach or detach the assisting engine used over the heavy grades between Newton and Plymouth; it is only in the event of the load being eleven vehicles or less that assistance is unnecessary with an engine of the "King" class. The non-stop run between Paddington and Plymouth, which for many years was the longest regularly performed not only in Great Britain, but in any part of the world, is still perpetuated, however, by the 12.50 a.m. newspaper express from Paddington, not conveying passengers. Below 200 miles, another journey of long standing which is no longer performed is that of the Great Central Section, L.N.E.R., over the 107·6 miles from Marylebone to Leicester via High Wycombe, as stops have now been substituted for slip coaches in the case of this express (6.20 p.m. from Marylebone) at Finmere and Woodford. Again there is a substitute, though at a considerably lower speed, in the shape of the 9.50 p.m. fast freight from Marylebone goods, which nightly runs non-stop to Leicester by this route.

Since the summer train service of 1935, the runs of the L.N.E.R. Silver Jubilee, 232·3 miles in each direction, between King's Cross and Darlington, have come into operation; and the King's Cross-Doncaster runs (156·0 miles) replace those between King's Cross and Wakefield (175·8 miles) in the case of the Yorkshire Pullman of the same company. A notable addition to the G.W.R. services is the Bristolian, at 67·6 m.p.h. over the 118·3 miles from Paddington to Bristol via Bath, and at 67·2 m.p.h. from Bristol to Paddington via Badminton; the 5.5 p.m. 2-hr. train from Paddington to Bristol is another new run of 117·6 miles. There are two additional runs between Euston and Crewe, 158·1 miles, and one more from Grantham to King's Cross, 105·5 miles; from Newcastle to Edinburgh, 124·4 miles, an important addition is the 130 min. run of the accelerated 1.20 p.m. from King's Cross, while on the West Coast route the 2 p.m. from Euston similarly provides a new run of 102·3 miles from Carlisle to Glasgow.

A striking feature of the 1936 timetable is the number of non-stop journeys of between 145·9 and 193·7 miles in length, of which, with two exceptions, the fastest in every case is timed at over 60 m.p.h. from start-to-stop. Another interesting point is the extent to which modern freight trains are worked over long distances without stopping, notable L.M.S.R. examples being from Crewe to Broad Street, 162·5 miles (a fish train); Crewe to Willesden Junction, 152·7 miles (a parcels train); on the G.W.R. there are runs from Greenford to Shrewsbury, 145·3 miles, and Newbury to Newton Abbot, 141·3 miles, with fitted freight trains, at average speeds of 38·8 to 45·1 m.p.h. The fastest runs from Paddington to Plymouth (56·4 m.p.h.) and Paddington to Newport (58·4 m.p.h.) are made by newspaper trains.

In the second table the totals of all runs of 90 miles in length and over are summarised; the grand total in 1936, for the first time on record, exceeds 200. In comparison with 1914, also, a considerable increase has been effected, from 175 to 203, and this despite the reduction of 15 in the number of such runs over the Midland Division of the L.M.S.R., where the claims of intermediate towns for improved service have been met by breaking into many of the longer journeys of the pre-war competitive days. It is singular that the L.M.S.R. schedules 35 runs of between 90 and 100 miles in length non-stop, whereas the L.N.E.R., by the geographical accident of the location of its principal towns, has none; so, whereas the L.M.S.R. total of 102 daily runs exceeding 90 miles considerably averages the L.N.E.R. 57 runs, in actual 100-mile runs and over the difference is small—67 against 57. The eight longest regular steam-hauled non-stop runs in the world, from 232·3 miles to 392·7 miles, are made daily in Great Britain.

DAILY NON-STOP BRITISH RAILWAY RUNS EXCEEDING 200 MILES IN LENGTH
SUMMER SERVICE, 1936

Railway	Section	Between	Distance	No. of Services Daily	Fastest		
					Train	Time	Av. Speed
			miles			min.	m.p.h.
L.N.E.R.	G.N. & N.E.	King's Cross-Edinburgh	392·7	*2	10.00 a.m. D / 10.00 a.m. U	435	54·2
L.M.S.R.	Western ..	Euston-Kingmoor (Carlisle)	301·1	1	10.00 a.m. D	322	56·1
,,	,, ..	Carlisle-Euston	299·1	†1	12.10 p.m. U	330	54·4
,,	,, ..	Euston-Holyhead ..	263·6	‡1	§ 8.30 a.m. D	293	54·0
,,	West. & Cal.	Glasgow-Crewe	243·3	1	10.45 p.m. U	305	47·9
L.N.E.R.	G.N. & N.E.	King's Cross-Darlington	232·3	2	5.30 p.m. D / 10.00 a.m. U	198	70·4
G.W.R. ..	—	Paddington-Plymouth (*a*)	225·5	1	12.50 a.m. D	240	56·4
L.M.S.R.	West. & Cal.	Crewe-Carstairs	214·6	*1	10.32 p.m. D	256	48·8
,,	Western ..	Euston-Prestatyn ..	205·5	*1	11.15 a.m. D	230	53·6

* Summer service only. † From Carlisle No. 12 Box (297·9 miles) during summer service.
‡ Daily during height of summer season only. § Saturdays only. (*a*) North Road Station.

TOTAL NUMBER OF DAILY BRITISH NON-STOP RUNS EXCEEDING 90 MILES IN LENGTH.

Railway	Section	Summer, 1936				Summer, 1914
		200 Miles and Over	150 Miles and Over	100 Miles and Over	90 Miles and Over	90 Miles and Over
		No.	No.	No.	No.	No.
L.M.S.R.	Western ..	6	31	55	76	52
	Midland ..	—	—	5	19	34
	Caledonian ..	—	—	7	7	4
	Total	6	31	67	102	90
L.N.E.R.	G.N.	4	10	31	31	22
	N.E.	—	—	15	15	8
	G.E.	—	—	6	6	9
	G.C.	—	—	5	5	4
	Total	4	10	57	57	43
G.W.R.	—	1	7	30	42	38
S.R. ..	Western ..	—	—	2	2	4
Grand Total ..		11	48	156	203	175

ROYAL SOCIETY OF ARTS ROAD TRANSPORT EXAMINATIONS.—The Royal Society of Arts has published the syllabuses of the examinations to be held in May–June next year for awards in road transport subjects. These examinations were instituted last year (the papers then set being reprinted with the new syllabuses) for the benefit of road transport employees who are not in a position to sit for the examinations of the Institute of Transport.

Preparatory courses are held at most technical schools, and candidates may present themselves for examination in a single subject, or in one of three groups of subjects (each based on a one-year course). A diploma in Road Transport is awarded to students who pass in all the subjects of the three groups. For those unable to take the full three-year course, certificates are awarded for the single subjects and individual groups.

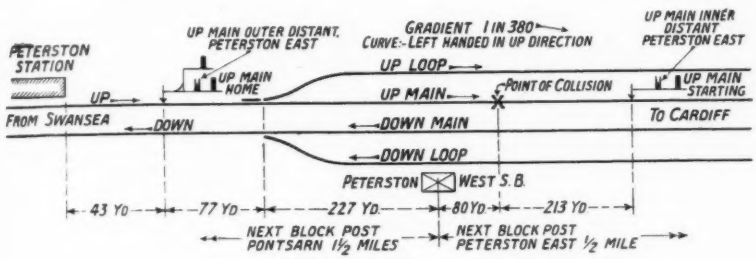
MINISTRY OF TRANSPORT ACCIDENT REPORT

Near Peterston, G.W.R.: June 10, 1936

At about 3.49 p.m. the 1.15 p.m. train, Carmarthen to Pontypool Road, consisting of five 8-wheeled bogie coaches drawn by 4-6-0 tender engine No. 5923, and travelling at about 30 m.p.h., collided with a light engine, 0-6-0 tank locomotive No. 8796, running at slow speed in the same direction on the up main line between Peterston West and East signal boxes. Twelve passengers and the two drivers received slight injuries or shock. Some permanent way was damaged. The weather was fine and clear. Lieut.-Colonel E. Woodhouse conducted the inquiry.

The accompanying diagram shows the lines and signals concerned, with relevant particulars. The light engine was sent from Peterston East to attach a coach to the rear of the 2.10 p.m. train, Swansea to Swindon. The engine and coach waited in the up loop till the train passed and stopped opposite Peterston West box, when the coach was attached in rear and the train departed. Such movements occur very rarely: only once a year with a passenger vehicle. The light engine then ran forward on the up main and stopped opposite the box. The fireman had left to carry out Rule 55 when he saw a following train signalled and heard it approaching. He and a goods guard, who had been on the engine, ran to warn it, but had not gone far when it passed them. The driver started the engine, which travelled a short distance before being overtaken. Driver Turner and Fireman Davies of the 1.15 p.m. train could not see the light engine or the men's signals until they reached the east end of the station, owing to the curve, and Turner estimated his speed as 60 m.p.h. approaching there, when he partially applied the brake as Peterston East outer distant was "on." Both men thought they saw the engine as they reached that signal; Turner saw a man on the ground signalling at the same time. An emergency brake application brought speed down to 30 or 35 m.p.h. when the collision took place.

Driver W. Gould, of the light engine, said he was just clear of the connection to the up loop, about 200 yd. from the box, when attaching the coach. Shortly after the 2.10 p.m. train disappeared he saw a green flag from the box; he moved the engine slowly up and stopped there, the starting signal being at danger. It was usual to do this, so that the fireman could go to and return from the box speedily. As soon as Fireman Morgan had left, Gould saw the starting signal lowered, thought it was for him and whistled to recall Morgan; he heard someone shout "Half a mo!" or something like it. He was sure it was not goods Guard Wooles, who was with him. Noticing the up home also lowered he got Wooles to go back to warn any train approaching while he ran the engine forward. Wooles confirmed this evidence, but heard no conversation between the signalman and Morgan; he thought Gould called out "Half a mo!" as he himself descended from the footplate. Gould had no recollection of making the remark.



Site of collision at Peterston

Morgan had seen the green flag exhibited, and when climbing down from the footplate saw the starting signal had been lowered; he called out "All right?" to the signalman, and heard a voice from the box say "Hold on a minute," or something to that effect, so went towards it; he then heard the train approaching and saw the home signal was "off," when he shouted to Gould and ran to give warning. He did not hear any conversation in the box or block bell signals. Entries in Pontsarn block register showed that "out of section" was received for the train to Swindon at 3.46 p.m., and the train from Carmarthen was accepted at the same time; "entering section" was sent at 3.47.

Signalman W. Ockewell, Peterston West, could give no coherent account of his actions just before the collision. He stated his original intention to be to send the engine back along the up loop, but could not recollect what happened after the train from Swansea left. If he flagged the engine it must have been after clearing back to Pontsarn and before accepting the train from Carmarthen. He did not remember Morgan calling to him, and denied that he answered. He was alone, and Morgan might have overheard a phrase in a telephone conversation, though he could not recollect telephoning at the time. Ockewell had told the company's officers that he knew the engine was on the up main and outside the box, but stated to Colonel Woodhouse that he did not recollect seeing it come forward.

T. H. Morgan, signalman at Peterston East, said a light engine was offered him on the up loop and accepted at 3.49 p.m., two minutes after he cleared back for the train from Swansea. Ockewell was unable to remember offering it and had no entry for it in his register. He admitted he was not booking promptly. There were other discrepancies, some figures were almost illegible, and the register was written up in a slovenly manner generally. Ockewell, who is 62, had been 24 years at Peterston and had a very good record.

Inspecting Officer's Conclusions

Colonel Woodhouse places responsibility for the accident on Signalman Ockewell, who could offer no explanation for his serious lapse, but expressed great regret for it. That he intended to send the engine back on the up loop may be accepted; it was the obvious course to take to avoid delay. It is established that the green flag was shown by Ockewell, but for some inexplicable reason without setting the engine back beyond the points and altering them. When it stopped opposite the box he was probably aware of it, but failed to notice it was not on the furthest line from him. If so it was natural to tell the fireman to wait while he offered the engine on the loop. Signalman Morgan's evidence that this was done is accepted. The phrase mentioned by Gould and Wooles might well have been their rendering of Ockewell's instructions to the fireman, which they might have overheard, or were repeated to them by him, though he did not recollect doing so. No undue delay appears to have been made in carrying out Rule 55. How long the engine stood at the box can only be surmised, but Colonel Woodhouse does not think it can have been more than a minute; and if Ockewell was under the impression above mentioned it is an open question whether the fireman's arrival would have corrected it before the passenger train arrived. Driver Gould started the engine with commendable promptitude and this undoubtedly minimised the collision.

Remarks

Though control of the home signals by track circuit would have prevented this accident Colonel Woodhouse is not disposed to recommend it; an excellent view of the line is obtainable from the box and shunting is not frequent.

UNITED STATES METALLIC PACKING CO. LTD.—The London office of this company is now at Coronation House, 4, Lloyd's Avenue, E.C.3.

Foundation Stone Laying Ceremonies at Leeds

On Wednesday last, October 7, the foundation stones of the new L.M.S.R. and L.N.E.R. station buildings and the new L.M.S.R. Queen's Hotel were ceremoniously laid by the Lord Mayor of Leeds (Alderman Percival T. Leigh) and the Earl of Derby respectively. Sir Josiah Stamp, President and Chairman of the Executive, L.M.S.R., who was accompanied by Sir Ralph L. Wedgwood, Chief General Manager, L.N.E.R., presided. Among those who accepted invitations to be present were:—

Sir Alan G. Anderson, M.P., Messrs. E. B. Fielden, W. L. Hichens, A. E. Pullar, G. R. T. Taylor, E. J. H. Lemon, C. M. Jenkin-Jones, J. P. Allix, S. T. Burgoyne, H. J. Connal, F. H. Cowell, Ashton Davies, W. Curtis Green, W. H. Hamlyn, B. L. Hurst, A. Morris, J. E. Papworth, Geoffrey Towle, W. K. Wallace, Sir Edwin Airey, Messrs. J. E. Acfield, R. L. Matthews, W. Vane Morland, and Thomas Thornton.

The new works begin the merging of the existing Wellington and New stations, to be known as the City station. The total expenditure on the scheme, which both provides an improvement in the amenities for the travelling public and enhances the appearance of Leeds City Square, is estimated to exceed £750,000.

The alterations and improvements to the stations will include a new concourse, new accommodation for the booking of passengers and the booking and handling of parcels traffic (including that now dealt with at the L.N.E.R. Central station), new refreshment accommodation, and other amenities for the convenience of passengers, roofing, platforms and permanent way. In addition, there will be a new block of office buildings to accommodate the Leeds District Passenger Manager and staff, as well as other district officers and their staff, altogether numbering over 300.

The concourse, which forms one of the main features of the improvement scheme, will be over 300 ft. long, 56 ft. wide, and approximately 34 ft. high. It will be built in the form of an enclosed hall with glazed doors leading to the platforms and will be the first example of its kind to be erected in this country. Round the concourse will be grouped the various station services including booking office, telegraph office, waiting rooms, refreshment rooms. The refreshment rooms will be served from the kitchens of the hotel.

At the conclusion of the ceremonies, a luncheon was given by the Lord Mayor in the new Civic Hall at which Lord Derby, proposing the toast of "The Queen's Hotel," referred to his presidency of two very distinctive and closely allied boards—the Travel and Industrial Development Association of Great Britain and Ireland, and the Hotel and Restaurant Association. In the building of the new Queen's Hotel, the railway company was doing a great deal for the trade of the country and especially for the vicinity. He was particularly glad to see a civic welcome given to the new hotel, as hotel keepers in the past had been continually hampered by legislation and by-laws.

Sir Ralph L. Wedgwood, proposing the toast of "The City of Leeds," said that he appreciated particularly the invitation to speak at a lunch to celebrate the enterprise of the L.M.S.R., their one-time competitors, but now their friends and fellow workers. There could have been no more appropriate place than Leeds for a fresh demonstration of "the union of hearts" in the railway world. Leeds had always shown what Shakespeare called a "mounting spirit," and a worthy conception of its mission as a great city. The Lord Mayor responded briefly.

Sir Josiah Stamp replied to Lord Derby's toast. The new offices would enable the L.M.S.R. to have a district passenger manager in Leeds. Referring to the new hotel, he said that the reputation of the hotel industry in this country rested to a great extent upon the railways. They could claim in the last 100 years to have been pioneers of reform and improvement, and the L.M.S.R. hoped that the new Queen's Hotel, which would be the greatest of its kind outside London, would maintain that reputation.

Mr. E. B. Fielden, Deputy Chairman, L.M.S.R., proposed a vote of thanks to the Lord Mayor. The Lady Mayoress also spoke briefly.

Closed Branch Lines—IV

London & North Eastern Railway

Below we tabulate details of the branch lines closed by the L.N.E.R. since the beginning of 1928. The previous tables in this series were published in our issues of August 28, September 4, and September 11.

Section of Line (4 ft. 8½ in. gauge unless otherwise noted under Remarks)	Passenger Service Withdrawn	Section Completely Closed	Remarks
Wisbech to Upwell	January 1, 1928	—	—
Nutbrook and Heanor ...	May 1, 1928	—	—
Cargo Fleet to Eston ...	March 11, 1929	—	—
Kirksmeaton to Wath ...	April 6, 1929	—	—
Gosforth to Ponteland ...	June 15, 1929	—	—
Stamford to Wansford ...	—	July 1, 1929	—
Selby to Cawood	December 31, 1929	—	—
Manuel to Coatbridge ...	May 1, 1930	—	—
Blackston to Bathgate ...	May 1, 1930	—	—
Bathgate to Morningside ...	May 1, 1930	—	—
Clackmannan to Dunfermline (via Kincardine)	July 7, 1930 ...	—	—
Chevington to Amble ...	July 7, 1930 ...	—	—
Alnwick to Coldstream ...	September 22, 1930	—	—
Bourne to Sleaford	September 22, 1930	—	—
Hexham to Allendale ...	September 22, 1930	—	—
Downham to Stoke Ferry ...	September 22, 1930	—	—
Wakefield to Barnsley ...	September 22, 1930	—	—
Somersham to Ramsey East	September 22, 1930	—	—
York to Scarborough line ...	September 22, 1930	—	All intermediate stations closed except Malton and Seamer; line remains open for through traffic.
Malton to Gilling	January 1, 1931 ...	—	—
Melmerby to Masham ...	January 1, 1931 ...	—	—
Murton to Durham (Elvet line)	January 1, 1931 ...	—	Closed from Pittington to Durham (Elvet)
Bradford to Shipley and Windhill	February 2, 1931	—	—
Mellis to Eye	February 2, 1931	—	—
Ely to St. Ives	February 2, 1931	—	—
Leen Valley Junc. to Langwith	September 14, 1931	—	—
Inverurie to Oldmeldrum ...	November 2, 1931	—	—
Wellfield to Stockton ...	November 2, 1931	—	—
South Howden to Cudworth	January 1, 1932	—	—
Markinch to Leslie	January 4, 1932	—	—
Bentley to Hadleigh ...	February 29, 1932	—	—
Drumburgh to Port Carlisle	—	June 1, 1932 ...	—
Aberlady Junc. to Gullane ...	September 12, 1932	—	—
Fountainhall to Lauder ...	September 12, 1932	—	—
Ellon to Boddam	October 31, 1932 ...	—	—
Leadburn to Dolphinton ...	—	March 31, 1933 ...	—
Monktonhall Junc. to Gifford	April 3, 1933	—	—
Millerhill to Glencorse ...	April 30, 1933 ...	—	—
Spean Bridge to Fort Augustus	December 1, 1933	—	—
Balloch to Gartness	October 1, 1934	—	—
Port of Menteith to Stirling...	October 1, 1934	—	—
Kilsyth to Bonnybridge ...	February 1, 1935	—	Closed to all traffic from Banknock Junc. to Bonnybridge

RAILWAY AND OTHER REPORTS

London Transport C Stock.—The London Passenger Transport Board announces that a final payment of interest on London Transport C stock for the year ended June 30, 1936, will be made by the board's registrars, the Bank of England, on October 29, 1936, to all holders of London Transport C stock registered or inscribed in the books of the Bank of England at the close of business on October 5, at the rate of 2½ per cent., less income tax at 4s. 9d. in the £, making with the interim payment of 1½ per cent., a total of 4 per cent. for the year. The board also announces that the whole of the considerations for undertakings transferred to or acquired by the board under the Act of 1933 have now been ascertained. The balances for the years ended June 30, 1934 and 1935, of the "interest suspense accounts" amount to £28,632, and do not permit of the payment of any further interest on the C stock for those years. They have, therefore, been transferred to the C stock interest fund, and are included in the revenue available for appropriation for the year ended June 30, 1936. The board also announces that it will shortly transmit to the Minister of Transport the report and copies of the statement of accounts and statistics and of the auditors' report for the year ended June 30, 1936, and that copies of the documents will be on sale on and after October 29, 1936.

Buenos Ayres Western Railway.—The directors announce that payment of a dividend of 5 per cent. for the year ended June 30, 1936, upon the company's 5 per cent. preference stock will be made on November 5 next. On the same date a dividend of 1 per cent. on the company's 4½ per cent. preference stock will be paid in respect of the same period, the board being of the opinion that no higher distribution would be justified having regard to the earnings of the past year.

Buenos Ayres Great Southern Railway.—It is announced by the directors that payment of a dividend of 1 per cent. for the year ended June 30, 1936, upon the company's 5 per cent. preference stock will be made on November 5 next. The board is of opinion that no further distribution on the 5 per cent. preference stock or any payment on the 6 per cent. preference stock would be justified having regard to the earnings of the past year.

Ribble Motor Services Limited.—This company, which is controlled jointly by the L.M.S.R. and Tilling & British Automobile Traction Limited, is paying an interim dividend of 4 per cent., the same as a year ago.

Vulcan Foundry Limited.—The accounts for the year ended June 30 show a profit on manufacturing account of £14,533, against £31,412 for the previous year. It is pointed out in the report that the balance on this account is affected by the completion or non-completion of contracts at the close of the year, which finds reflection in the item "work in progress"; at June 30 last this item stood at £245,471, against £127,711 a year previously. After crediting investment income, &c., and meeting charges for general repairs, &c., allowing £5,000 for the dividend on the preference shares, there is a balance on revenue account of £17,054. The balance on profit on realisation of investments account is £29,796, from which the directors recommend a distribution on the ordinary capital of 2½ per cent. (the same), absorbing £21,127, leaving £8,669, which will be transferred to revenue account, making the carry forward £25,724. Competition for locomotive and boiler work has remained exceedingly keen, and the volume of work has not been sufficient to maintain the level of employment necessary for economical working conditions. The works showed an improved ratio of employment during the last quarter, which has further advanced since the close of the financial year. Considerable progress has been made in connection with the development of the Vulcan-Frichs diesel locomotive.

Firth (Thomas) & John Brown Limited.—An interim dividend of 5 per cent. free of tax, will be paid on October 15. No interim dividend was paid last year, but a payment of 12½ per cent., tax free, was made for the whole of 1935.

Clayton Dewandre Co. Ltd.—An interim dividend of 3 per cent. has been paid on the ordinary shares; warrants were posted on October 6. No interim distribution was made in 1935, but 5 per cent. was paid for the whole year.

Hurst, Nelson & Co. Ltd.—Net profits for the year ended July 18 last amounted to £30,190, against £22,372 for the previous year. After providing for preference dividends and for a dividend of 1s. 3d. a share (6¼ per cent.) on the ordinary £1 shares, compared with 9d. a share (3¾ per cent.) for the previous year, the sum of £7,766 remains to be carried forward, as against £5,713 brought in.

L.M.S.R. and L.N.E.R. Joint Committee Changes

Since October 1 the L.N.E.R. has been responsible for the management of the Midland & Great Northern Railways Joint Committee and the Norfolk & Suffolk Joint Railways Committee, and various consequential changes have been made in the constitution of the L.M.S.R. and L.N.E.R. Joint Committees. So far as the two East Anglian undertakings are concerned, Mr. James McLaren has been appointed Secretary to the Midland & Great Northern Railways Joint Committee, and the Norfolk & Suffolk Joint Railways Committee; the registers of the Midland & Great Northern Joint Line rent-charge stock (3 per cent.) will be kept at the London & North Eastern Railway Company's registration office, Hamilton Buildings, Liverpool Street station, E.C.2. The change in the secretaryship is, however, but one of the results of the redistribution of the units of the L.M.S.R. and L.N.E.R. Joint Committees.

Heretofore, various pre-grouping joint committees which, on grouping in 1923, became the joint property of the L.M.S.R. and the L.N.E.R., have been managed under four group committees as follow:—

Group 1, under the secretaryship of Mr. James McLaren, at Marylebone station, N.W.1, comprised:—

Great Central & North Western (15 miles).
Great Central & Midland (39 miles).
Great Central & North Staffs (11 miles).
Great Central, Hull & Barnsley and Midland (5 miles).
Great Northern and London & North Western (45 miles).
Halifax and Ovenden (2¼ miles).
Halifax High Level (3 miles).
Leeds New Station.
Methley Railway (6 miles).
Wakefield (Westgate) Station.

Group 2, under the secretaryship of Mr. G. R. Smith, at Euston station, N.W.1, comprised:—

Midland & Great Northern (183 miles).
Mid-Nottinghamshire (6½ miles).
Norfolk & Suffolk (22 miles).
Tottenham & Hampstead (4¾ miles).

Group 3, under the secretaryship of Mr. G. R. Smith, at Euston station, N.W.1, comprised:—

Axholme (28 miles).
London & North Western and Great Northern Joint Stations.
Midland & North Eastern (Swinton and Knottingley) (18¼ miles).
Normanton Station.
Otley & Ilkley (6½ miles).
South Yorkshire (30 miles).
Tebay Joint Station.

Group 4, under the secretaryship of Mr. James McLaren, at Marylebone station, N.W.1, comprised:—

Aberdeen Joint Passenger Station.
Dundee & Arbroath Joint Line (including Carmyllie Light Railway) (23 miles).

and, under the secretaryship of Mr. T. H. Moffat, at 302, Buchanan Street, Glasgow, comprised:—

Carlisle (Dentonholme) Goods Station.
Dumbarton & Balloch Joint Line (7¼ miles).
Grangemouth Branch Railway.
Perth General Station.
Perth Station Hotel.
Princes Dock Branch Joint (1¼ miles).

The changes that came into force on October 1 are the transfer to Group 1 of the M. & G.N. and the Norfolk & Suffolk; and the transfer to Group 3 of the Mid-Nottinghamshire and the Tottenham & Hampstead. The old Group 2 therefore ceased to exist, and the re-formed groups were renumbered. Group 1 (with its additions) retains its number; Group 3 (with its additions) becomes Group 2; and Group 4 (unaffected by the changes) becomes Group 3.

XUM

NOTES AND NEWS

L.M.S.R. Station Gardens Competition.—The L.M.S.R. station at Sandy, Bedfordshire, has been awarded first prize in the Southern Area station gardens competition.

Annual Dinner of the "Mechanicals."—The annual dinner of the Institution of Mechanical Engineers will be held at Grosvenor House, Park Lane, on Thursday, October 22.

Railway Accident in Polish Corridor.—A German passenger train from Berlin to Pila collided, on October 1, with a goods train at Lamberg, in the Polish Corridor. Twenty persons are reported to have been killed and 150 injured.

European-Asiatic Rail Freights.—A press message from Moscow states that the annual European-Asiatic Railways Conference was concluded there on October 3. The Soviet State Railways have been entrusted with the management of freight passing by railway through the U.S.S.R. between European and Asiatic countries for the next five years.

Television at Waterloo.—On Tuesday the Southern Railway introduced regular television programmes at Waterloo station. Every week-day, except Saturdays, the programme broadcast from Alexandra Palace will be shown in the waiting room opposite No. 16 platform, from 11.0 a.m. to 12 noon, and from 3.0 p.m. to 4.0 p.m. Admission is free, but is restricted to holders of railway tickets, including season tickets.

European Timetable Conference.—The annual European Timetable Conference (Conference Européenne des Horaires et des Services Directs, or Europäische Fahrplan und Wagenbeistellungs-Konferenz) is being held this year at Montreux. It opens on Monday next, October 12, and continues until October 17. This conference discusses arrangements for next summer's through international train services, which form the basis of many of the national timetables, and must therefore be fixed early.

Canadian Pacific Earnings.—Gross earnings of the Canadian Pacific Railway for the month of August, 1936, amounted to $12,010,000, an increase of $1,074,000 in comparison with August, 1935. In the working expenses of $11,376,000 there was an increase of $948,000, leaving net earnings $126,000 higher, at $634,000. Aggregate gross earnings for the first eight months of 1936 were $85,632,000, an increase of $7,037,000 and the net earnings of $8,404,000 were higher by $307,000.

Canadian National Earnings.—For the month of August, 1936, gross earnings of the Canadian National Railways amounted to $15,733,625, an increase of $1,537,155 in comparison with August, 1935. Operating expenses ($15,053,044) advanced by $1,426,246 to leave net earnings of $680,581, which were $110,909 lower than for August, 1935. Aggregate gross earnings from January 1 to August 31, 1936, were $116,491,348, an improvement of $7,291,951, but the net earnings for the eight months were $600,506 lower, at $3,242,824.

London Tramway Service Replaced.—On Tuesday, October 6, the London Transport tramway service No. 73, running between Wanstead Park and the Royal Albert Docks, was worked for the last time. Part of this route was opened as long ago as June 22, 1901, by the East Ham Corporation, and was therefore one of the earliest electric tramways in the Metropolis; the extension to the Royal Albert Docks was opened on August 27, 1902. The route was scheduled by London Transport for conversion to trolleybus working, but petrol buses have now replaced the trams. Workmen's fares and season tickets which have been available on the trams are transferred to the buses.

The Jaywick Miniature Railway.—As we briefly recorded in our issue of August 7, a one-mile miniature railway at Jaywick, near Clacton, was officially opened on July 31 last by Mr. C. H. Newton, Divisional General Manager (Southern Area), L.N.E.R. The locomotive used is based on the well-known G.N.R. "eight footer" design of Patrick Stirling, and is a complete rebuild of an 18-in. gauge engine formerly at work on the Fairbourne Miniature Railway, near Barmouth. We reproduce below a photograph of the engine and train. From the Miniature Railway & Specialist Engineering Company, the proprietor of the Jaywick line, we learn that the locomotive in use there incorporates the frames and, curiously enough, the boiler of the old Fairbourne engine. The cylinders are oiled by a ratchet-operated mechanical lubricator, and the tender is fitted with air brakes. The latter are to be extended to the coaches. The coachwork of the three passenger vehicles was by Caffyns of Eastbourne, but all mechanical gear, and the rebuilding of the locomotive, are the work of the Miniature Railway & Specialist Engineering Company. The permanent way, of flat-bottomed rails (12 lb. per yard), bolted to steel sleepers, runs along the top of an old, picturesquely curving dyke for approximately one mile between Jaywick Sands and the Tudor Village.

Inventions Exhibition.—The 1936 International Exhibition of Inventions, opened on September 30 at the Central Hall, Westminster, and continues until tomorrow. There are two sections, the upper hall occupied by trade stands, and the lower principally by private exhibits of inventors' work. There is a goodly number of subjects of engineering interest, including applications of novel ideas to internal combustion engines, steam engines, transmissions, and gearing. The Southern Railway displays a showcase model of a cross-Channel steamer, while the L.N.E.R. similarly shows a model of the *Flying Scotsman* locomotive, and includes literature giving particulars of the Silver Jubilee train and its services.

Opening of Railway on the Rügendamm.—The first train passed over the new railway connection on the Rügendamm, between the island of Rügen and the German mainland on October 5; the roadway is to be opened some weeks later. The undertaking is the realisation of a scheme dating as far back as 1863, and replaces a ferry service that has been running for many years. The inconvenience of the latter has been especially felt since the war. Proposals for building either an elevated bridge or a tunnel were considered but were found too costly. A dam was decided on, with movable bridge opening for ship traffic, the total length of which from bank to bank is 2·5 km. (1·55 miles). It accommodates both a single-line railway and a road. The financing of the undertaking has

Train on the Jaywick Miniature Railway

not been easy, the total sum required being nearly 26 million Reichsmark. Sweden was willing to assist with a loan, but the depreciation of the Krona deferred the conclusion of an agreement and eventually Germany—partly with Reichsbahn funds—found the capital; work was begun in 1932. A considerable increase in road traffic is expected, as well as improved railway services from Scandinavia to western Germany. The Rügendamm bridge was described by Dipl. Ing. O. Bondy in our issue of September 27, 1935, in the course of his series of articles on welding progress.

Good Loadings on the Hiawatha. — The Hiawatha, the well-known streamlined train of the Chicago, Milwaukee, St. Paul & Pacific, carried during August a total of 34,119 revenue passengers, an average of 1,101 each day. These figures include paying passengers on the sections operated between Chicago, Milwaukee, and the Twin Cities and those travelling on the North Woods section, in service this summer, between Chicago and Milwaukee and the resort regions of northern Wisconsin. Since the Hiawatha began operation, on May 29, 1935, a total of 323,585 paying passengers used the train up to the end of August of this year, an average of 701 daily. August business this year is 36 per cent. ahead of that for the same month a year ago, when 25,003 revenue passengers travelled on the train.

Road Accidents.—The Ministry of Transport return for the week ended October 3 of persons killed or injured in road accidents is as follows. The figures in brackets are those for the corresponding period of last year :—

	Killed, including deaths resulting from previous accidents		Injured	
England ..	110	(107)	3,871	(3,926)
Wales	6	(8)	153	(159)
Scotland ..	8	(12)	409	(396)
	124	(127)	4,433	(4,481)

The total fatalities for the previous week were 156, compared with 142 for the corresponding period of last year.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 40th Week			Totals to Date		
	1936	1935	Inc. or Dec.	1936	1935	Inc. or Dec.
L.M.S.R. (6,916½ mls.)	£	£	£	£	£	£
Passenger-train traffic...	511,000	470,000	+ 41,000	20,420,000	19,992,000	+ 428,000
Merchandise, &c. ...	518,000	490,000	+ 28,000	18,886,000	17,838,000	+1,048,000
Coal and coke ...	242,000	233,000	+ 9,000	9,486,000	9,055,000	+ 431,000
Goods-train traffic ...	760,000	723,000	+ 37,000	28,372,000	26,893,000	+1,479,000
Total receipts	1,271,000	1,193,000	+ 78,000	48,792,000	46,885,000	+1,907,000
L.N.E.R. (6,332 mls.)						
Passenger-train traffic...	325,000	306,000	+ 19,000	13,259,000	13,010,000	+ 249,000
Merchandise, &c. ...	351,000	337,000	+ 14,000	12,800,000	12,309,000	+ 491,000
Coal and coke ...	235,000	224,000	+ 11,000	9,174,000	8,733,000	+ 441,000
Goods-train traffic ...	586,000	561,000	+ 25,000	21,974,000	21,042,000	+ 932,000
Total receipts	911,000	867,000	+ 44,000	35,233,000	34,052,000	+1,181,000
G.W.R. (3,746½ mls.)						
Passenger-train traffic...	204,000	189,000	+ 15,000	8,618,000	8,505,000	+ 113,000
Merchandise, &c. ...	209,000	195,000	+ 14,000	7,549,000	7,231,000	+ 318,000
Coal and coke ...	98,000	98,000	—	3,974,000	3,900,000	+ 74,000
Goods-train traffic ...	307,000	293,000	+ 14,000	11,523,000	11,131,000	+ 392,000
Total receipts	511,000	482,000	+ 29,000	20,141,000	19,636,000	+ 505,000
S.R. (2,153 mls.)						
Passenger-train traffic...	301,000	278,000	+ 23,000	12,612,000	12,420,000	+ 192,000
Merchandise, &c. ...	69,000	63,500	+ 5,500	2,496,500	2,456,000	+ 40,000
Coal and coke ...	30,000	29,500	+ 500	1,223,500	1,169,000	+ 54,000
Goods-train traffic ...	99,000	93,000	+ 6,000	3,720,000	3,626,000	+ 94,000
Total receipts	400,000	371,000	+ 29,000	16,332,000	16,046,000	+ 286,000
Liverpool Overhead ... (6½ mls.)	1,155	1,163	— 8	47,929	47,784	+ 145
Mersey (4½ mls.) ...	4,455	4,377	+ 78	161,209	159,624	+ 1,585
*London Passenger Transport Board ...	568,700	555,300	+ 13,400	7,803,600	7,568,100	+ 235,500
IRELAND						
Belfast & C.D. pass. (80 mls.)	2,404	2,081	+ 323	108,419	106,586	+ 1,833
,, ,, goods	567	450	+ 117	21,357	19,876	+ 1,481
,, ,, total	2,971	2,531	+ 440	129,776	126,462	+ 3,314
†Great Northern pass. (543 mls.)	13,000	10,600	+ 2,400	441,700	423,650	+ 18,050
,, ,, goods	11,100	12,000	— 900	372,300	366,650	+ 5,650
,, ,, total	24,100	22,600	+ 1,500	814,000	790,300	+ 23,700
†Great Southern pass. (2,067 mls.)	41,832	35,393	+ 6,439	1,463,995	1,424,411	+ 39,584
,, ,, goods	48,201	48,917	— 716	1,602,812	1,498,178	+ 104,634
,, ,, total	90,033	84,310	+ 5,723	3,066,807	2,922,589	+ 144,218

* 39th week. † 14th week.

British and Irish Railways Stocks and Shares

Stocks	Highest 1935	Lowest 1935	Prices Oct. 7, 1936	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	55½	44½	59½	+1½
5% Con. Prefce ...	124	108	123	—
5% Red.Pref.(1950)	117	106⅝	110½	+1
4% Deb.	118½	108	118	—
4½% Deb. ...	122	110	119½	+1
4½% Deb. ...	129½	118	127½	−½
5% Deb.	140¼	130	138½	+1
2½% Deb. ...	82¼	68½	76	—
5% Rt. Charge ...	137	128	135½	—
5% Cons. Guar. ...	136¾	120½	133	—
L.M.S.R.				
Ord.	25 5/16	16	30	+1
4% Prefce. (1923)	58¼	43½	79	+½
4% Prefce. ...	87½	73½	89½	+1
5% Red.Pref.(1955)	107	97¾	107½	+1
4% Deb.	110¼	99½	110	—
5% Red.Deb.(1952)	119 11/16	111 5/16	117½	+1
4% Guar. ...	105⅝	95½	105½	—
L.N.E.R.				
5% Pref. Ord. ...	15⅞	8¼	13¼	—
Def. Ord. ...	7 9/16	4¾	6¼	—
4% First Prefce.	74¾	48	77½	+1½
4% Second Prefce.	31¾	16¼	31½	+½
5% Red.Pref.(1955)	92¼	71	96½	—
4% First Guar. ...	103 11/16	93	103	+½
4% Second Guar.	98¾	82½	98½	+½
3% Deb.	86	75	84	—
4% Deb.	109¼	98½	108	—
5% Red.Deb.(1947)	118¼	106½	111½	+1
4½% Sinking Fund Red. Deb.	112½	108	110½	+1
SOUTHERN				
Pref. Ord. ...	87½	69¾	98	+2
Def. Ord. ...	25 15/16	16¾	25	+¼
5% Prefce. ...	124	108¼	123	—
5% Red.Pref.(1964)	117¾	109½	116½	—
5% Guar. Prefce.	136½	121½	133	+1
5% Red.Guar.Pref. (1957)	121¼	112½	117½	—
4% Deb.	116¾	107	116	—
5% Deb.	138	130¼	137½	+1
4% Red. Deb. 1962–67	115	106½	112½	—
BELFAST & C.D.				
Ord.	9	4	4½	—
FORTH BRIDGE				
4% Deb.	111¼	104¼	105½	—
4% Guar. ...	109⅞	104	105½	—
G. NORTHERN (IRELAND)				
Ord.	20	7	13¾	—
G. SOUTHERN (IRELAND)				
Ord.	57½	14½	58	—
Prefce.	50	25¼	62	—
Guar.	88¾	51¼	91	—
Deb.	86¼	70	95¼	+¼
L.P.T.B.				
4½% "A" ...	130	119¾	126½	—
5% "A" ...	139¾	130	135½	—
4½% "T.F.A." ...	113¾	108	110	—
5% "B" ...	131½	122¾	129	+½
"C"	109½	91	103*	−3
MERSEY				
Ord.	23⅛	9¼	37	+3
4% Perp. Deb. ...	100½	93½	100	—
3% Perp. Deb. ...	75½	67	76½	—
3% Perp. Prefce.	62	47¼	67½	+1

* ex dividend

CONTRACTS AND TENDERS

Craven's Railway Carriage & Wagon Co. Ltd. has received an order from the L.N.E.R. for 80 25-ton four-wheeled hoppered iron ore wagons.

The Metropolitan-Cammell Carriage & Wagon Co. Ltd. has received an order from the Dorada Railway Co. Ltd. for six bogie convertible cattle wagons of 25,000 kilos. capacity, for the 3-ft. gauge.

Lobnitz & Co. Ltd. is reported to have received an order from the South African Railways and Harbours Administration for three steam tugs.

Frank How & Co. Ltd. has received contracts for cylinder oil for the Egyptian State Railways and for lubricating oil for the Egyptian Delta Light Railways.

Barrett Tagant & Gotts Limited has received an order from the Egyptian State Railways Administration for grease at a total price of £185 delivered f.o.b. London. (Order No. 59,189.)

H. J. Skelton & Company has received an order from the Egyptian State Railways Administration for mild steel at a total price of £355 f.o.b. Glasgow, Middlesbro', Newport. (Ref. No. E.S.R. 1.292.)

W. & T. Avery Limited has received an order from the Indian Stores Department for five portable platform weighing machines with back rails.

Craven Brothers (Manchester) Limited has received an order from the Indian Stores Department for one Wadkin 14-in. horizontal belt sander.

Saxby & Farmer (India) Limited has received an order from the Indian Stores Department for 187 home and 34 warning signal arms in vitreous enamel.

William Jacks & Co. has received an order from the North Western Railway of India for one 8¾/9½-ton compound steam road roller to be manufactured by John Fowler & Co. Ltd.

The Asbestos & Belting Co. Ltd. has received a rate contract from the Indian Stores Department for the supply of files to be manufactured by Henry Rossell & Co. Ltd.

Ramchand Jethmal has received an order from the Indian Stores Department for 800 cwt. of galvanised, stranded steel wire for signalling purposes at a total price of Rs. 13,671, free delivery N.W.R. Stores Depôt, Karachi.

The Yorkshire Engine Co. Ltd. has received an order from the Madras & Southern Mahratta Railway for four superheated locomotive boilers for MHS class 4-6-0 locomotives, to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

Tenders are invited by the Egyptian State Railways Administration, receivable by December 29, at the General Management, Cairo, for the supply of 38 10-ton petrol tank wagons.

Henschel & Sohn A.G. has received through the Bombay Co. Ltd. an order from the Great Indian Peninsula Railway for a quantity of cylinders, piston valve liners, studs and nuts, and one piston valve.

The South African Railways & Harbours Administration, Stores Department, is calling for tenders (Tender No. 1060) for the supply and delivery of quantities of bolts, nuts, screws, rivets and washers for 100 open high-sided steel bogie wagons (type BB.4), which are to be built at Durban. Tenders receivable by October 26 and endorsed "Tender No. 1060 for Bolts, Nuts and Rivets, &c." should be addressed to the Chief Stores Superintendent, Park Station Chambers, Johannesburg.

Tenders are invited, receivable by the Agent, Assam-Bengal Railway, Chittagong, by October 19, for the supply of 10 metre-gauge bogie petrol tank wagons of 4,500 gall. capacity, I.R.S. MBTP type, complete with vacuum and hand brakes, but without wheels and axles. The tanks are to be 27 ft. long and 6 ft. 7 in. diam. The length over headstocks of the wagons is to be 29 ft. 6 in., and the bogie centres are to be 18 ft. apart.

Forthcoming Events

Oct. 9 (*Fri.*).—Institute of Welding (Midlands) at James Watt Inst., Birmingham, 7.15 p.m, "Manufacture of Welding Wire," by the Chairman.

Railway Students' Association (Edinburgh), at Goold Hall, St. Andrew Square, 7.30 p.m. "Success, the Various Ingredients which go to the Making of Such, and the Power of Personality," by Mr. G. Begg.

Oct. 10 (*Sat.*).—Stephenson Locomotive Society (Midlands–Northern), at 4, Bury Old Road, Manchester, 6 p.m. Annual General Meeting.

Oct. 12 (*Mon.*).—Diesel Engine Users' Association, at Caxton Hall, Caxton Street, London, S.W.1, 4.45 p.m. "The Present Position of Special Steels for Diesel Engines," by Dr. S. Dorey.

Institute of Transport, at Inst. of Electrical Engineers, Savoy Place, London, W.C.2, 5.30 p.m. Presidential Address by Sir Alfred Read.

Stephenson Locomotive Society (London), at Dining Club, King's Cross Station, L.N.E.R., N.1, 6.30 p.m. "Reminiscences and Railway Experiences," by Mr. J. Maskelyne.

Oct. 13 (*Tues.*).—Institution of Heating and Ventilating Engineers (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 7 p.m. "Warmth and Comfort," by Mr. T. Bedford.

L.N.E.R. (Newcastle–Sunderland) Lecture and Debating Society, at Newcastle, 7 p.m. "The Working and Outlook of the Goods Commercial Department," by Mr. W. Blakey.

Permanent Way Institution (Sheffield), at Royal Victoria Hotel, 7 p.m. "Permanent Way Materials—Stocks and Usage," by Mr. B. Simmerson.

Illuminating Engineering Society, at the Lighting Service Bureau, 2, Savoy Hill, London, S.W.2, 5.30 p.m. Opening meeting of session and presidential address by Mr. Arthur Cunnington, Assistant to the Chief Engineer, Southern Railway, for Lighting, Heating, and Water.

Oct. 14 (*Wed.*).—Institute of Welding (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 6.30 p.m. "Internal Stresses in Welding and their Determination," by Dr. L. Reeve.

Institute of Welding (Scottish), at Royal Philosophical Inst., 207, Bath Street, Glasgow, 7.30 p.m. "Electric Arc Welding Equipment," by Mr. A. Bent.

L.N.E.R. (Darlington) Lecture and Debating Society. "A Realist View of the Railway Future," by Mr. W. A. Willox.

Permanent Way Institution (London), at London Transport Dining Club, Pelham Street, S.W.7, 7 p.m. "The Evolution of Underground Stations," by Mr. T. Bilbow.

Oct. 15 (*Thurs.*).—G.W.R. (London) Lecture and Debating Society, at General Meeting Room, Paddington Station, W.2, 5.45 p.m. "The Flow of Peoples," by Mr. W. W. Wakefield, M.P.

Institute of Fuel, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 2.30 p.m. Presidential Address by Sir Philip Dawson. Annual Dinner and Dance, at Connaught Rooms, Great Queen Street, Kingsway, 6.45 for 7.15 p.m.

Institute of Metals (London), at National Physical Laboratory, Teddington, Middlesex, 7.30 p.m. "The Common Field of the Engineer and Metallurgist," by Mr. H. Gough.

Institute of Welding (Leeds), at Hotel Metropole, 7.30 p.m. "Copper Welding," by Mr. H. Martin.

Institution of Locomotive Engineers (Manchester), at Literary Society, 36, George Street, 7 p.m. Address by the President.

Institution of Locomotive Engineers (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. Reminiscences of the Visit to Germany, June, 1936.

Oct. 16 (*Fri.*).—Permanent Way Institution (Newcastle), at Mining Inst., Westgate Road, 7 p.m. "The Influence of Invention on Railway Development," by Mr. W. A. Willox.

Oct. 17 (*Sat.*).—Permanent Way Institution (Manchester–Liverpool), at Temperance Inst., London Street, Southport, 3 p.m. "Relaying in Woodhead Tunnel," by Mr. A. Nixon.

Stephenson Locomotive Society (Scottish), at Mathieson's, High Street, Falkirk, 3 p.m. Business Meeting and Dinner.

Oct. 20 (*Tues.*).—British Timken Limited, at May Fair Hotel, Berkeley Square, London, W.1, 7.30 p.m. Annual Dinner.

Federation of Railway Lecture and Debating Societies (N.E. Area), at York, 7 p.m. "Education and Industry," by Mr. J. Nicholson.

Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "Road Transport Statistics," by Mr. A. Kirkus.

Permanent Way Institution (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. "Rail Joints," by Mr. W. White.

Oct. 21 (*Wed.*).—Institute of Welding (Manchester), at College of Technology, 7.30 p.m. "Internal Stresses in Welding and their Determination," by Dr. L. Reeve.

Railway Engineers' Oxy-Acetylene Welding Conference, at British Oxygen Co. Ltd., North Circular Road, Cricklewood, London, N.W.2.

Oct. 22 (*Thurs.*).—Institution of Electrical Engineers, Savoy Place, London, W.C.2, 6 p.m. Presidential Address by Mr. H. Young.

Oct. 23–24.—L.M.S.R. (London) Dramatic Society, at Cripplegate Inst. Theatre, Golden Lane, E.C.1, 8 p.m. "The Last of Mrs. Cheyney."

Forthcoming Meetings

Oct. 28 (*Wed.*)—**Buenos Ayres Great Southern Railway Co. Ltd.** (Annual General), River Plate House, Finsbury Circus, E.C.2, at 12.15 p.m.

Nov. 4 (*Wed.*)—**Buenos Ayres Western Railway, Limited** (Annual General), River Plate House, Finsbury Circus, E.C.2, at 12.15 p.m.

LEGAL AND OFFICIAL NOTICES

In the Court of the Railway Rates Tribunal.

Road and Rail Traffic Act, 1933
Agreed Charges

NOTICE IS HEREBY GIVEN that Applications for the approval of Agreed Charges under the provisions of Section 37 of the Road and Rail Traffic Act, 1933, short particulars of which are set out in the Schedule hereto, have been lodged with the Railway Rates Tribunal.

The Procedure to be followed in regard to the inspection of the said Applications and the filing of Notices of Objections is that published in the "London Gazette" of 28th July, 1936.

Printed copies of the Procedure can be obtained from the Office of the Tribunal, Bush House, Aldwych, London, W.C.2.

Notices of Objection to any of the said Applications must be filed on or before the 30th day of October, 1936

A copy of each Application can be obtained from Mr. G. Cole Deacon, Secretary, Rates and Charges Committee, 35, Parliament Street, Westminster, London, S.W.1, price 1s. post free.

T. J. D. ATKINSON,
Registrar.

7th October, 1936.

Number of Application	Name of Trader and General Description of Traffic
1936—No. 449	H. WORSWICK LIMITED, Arcadia Works, Lytham, Lytham St. Annes; Slippers, etc.
1936—No. 450	WHYTE, RIDSDALE & CO. LTD., 74, 75 and 76, Houndsditch, Bishopsgate, London, E.C.3; General Stores, Wares, etc., *(Applicable also to traffic consigned by one Associated or Subsidiary Company).*
1936—No. 451	BRITISH HORTICULTURAL CO. LTD., Walton, Peterborough; Bulbs, Plants, Seeds, etc. *(Applicable also to traffic consigned by two Associated or Subsidiary Companies).*
1936—No. 454	JOHN WALLACE (SAUSAGE MAKERS) LIMITED, 54–64, Oswald Street, Glasgow; Live Pigs.
1936—No. 455	THE CRESCENT TOY CO., LTD., 8, Fountayne Road, South Tottenham, London, N.15; Toys, etc.
1936—No. 456	GUARANTEED TOOLS LIMITED, 12–13, Chiswell Street, London, E.C.1; Carpenters' Tools.
1936—No. 457	R. LEHMANN & CO., LTD, Peninsular House, Monument Street, London, E.C.3; Condensed Milk, Preserves and Provisions, Drapery, Soap, etc.
1936—No. 458	PIRIE APPLETON & CO. LTD., Aldgate House, 46/58, Mansell Street, London, E.1; Paper, Stationery, etc., ex London *(Applicable also to traffic consigned by one Associated or Subsidiary Company.)*
1936—No. 459	SCROGGIE BROS., 4, North Road, London, N.7; Groceries, Confectionery, Paper, Bread Preparing Machines, Hardware, General Shop Furnishings, etc.
1936—No. 460	STAR MANUFACTURING COMPANY, Cubitt Town, London, E.14; E.14; Perambulators, Invalid Chairs, Toys, etc. *(Applicable also to traffic consigned by one Associated or Subsidiary Company.)*
1936—No. 461	STERLINGS LIMITED, Pudsey; Boots and Shoes.
1936—No. 462	HOWARD WALL LIMITED, 25–37, Hackney Road, London, E.2; Hardware, Hair Waving Machines, Cotton and Linen Goods, Haberdashery, Shoes, etc.
1936—No. 463	WORCESTERSHIRE CANNING CO. LTD., Tenbury Wells, Worcestershire; Preserved Fruits.
1936—No. 464	J. & J. BATTEN & CO. LTD., 24 and 25, Rood Lane, London, E.C.3; Tea and Coffee. *(Applicable also to traffic consigned by three Associated or Subsidiary Companies.)*
1936—No. 465	CAPSEALS LIMITED, Trading Estate, Slough; Cardboard Containers and Discs.
1936—No. 466	CLEEVES LIMITED, Cleevedale Park, Clapham, London, S.W.4; Confectionery.
1936—No. 467	DAIRY SUPPLY CO. LTD., Cumberland Avenue, Park Royal, N.W.10; Dairy Machinery Appliances and Utensils, etc. *(Applicable also to traffic consigned by one Associated or Subsidiary Company.)*
1936—No. 468	DYSON AND HORSFALL LIMITED, Aqueduct Mills, Preston; Clothing, Drapery and General Stores Wares.
1936—No. 469	THE FORE STREET WAREHOUSE CO. LTD., 104, Fore Street, London, E.C.2; Clothing, Drapery, Haberdashery, Earthenware, Glass Cabinets, etc.
1936—No. 470	THOS. MARSHALL & SON LTD., Wellington Bridge, Leeds, 12; Iron or Steel Cisterns, Tanks, Dustbins, Wringer Stands, etc.
1936—No. 471	R. ROWLEY & CO. LTD., Queen Street, Leicester; Hosiery.
1936—No. 472	THE SOUTH WALES SACK AND BAG CO. LTD., Dumballs Road, Cardiff; Sacks, Sacking and Twine.
1936—No. 473	THE TAUNTON CIDER CO. LTD., Norton Fitzwarren, Somerset; Cider.
1936—No. 474	THE TAUNTON CIDER CO. LTD., Norton Fitzwarren, Somerset; Returned Empties.
1936—No. 475	TAYLOR, LAW & CO. LTD., Tala Works, Adams Street, Birmingham, 7; Tinware and Hardware.
1936—No. 476	W. TREVOR WATKINS, Ystrad Mynach; Cattle, Calves, Pigs and Sheep.
1936—No. 477	THE WELSH TINPLATE & METAL STAMPING CO. LTD., Llanelly; Enamelled Ware, Tinware, etc.
1936—No. 478	EXCEL CO. LTD., 50 and 52, St. John Street, West Smithfield, London, E.C.1; Cooked Meats, Preserved Provisions, and Sausages.
1936—No. 479	FLEMING REID & CO. LTD., Greenock; Returned Empties.
1936—No. 480	JOHN HEEMSKIRK, 7, Rashleigh House, Thanet Street, London, W.C.; Bubls, Plants and Rose Trees.
1936—No. 481	G. ROBINSON & SONS (CORNWALL) LTD., Camelford, Cornwall; Rabbits (dead).
1936—No. 482	WELCH, MARGETSON & CO. LTD., 16, Moor Lane, London, E.C.2; Textiles, Slippers and Umbrellas.
1936—No. 483	CARRICK'S OF CUMBERLAND, Low Row, near Carlisle; Cooked Meats, Cream, Sweetmeats, etc.
1936—No. 484	A. GOLDENFELD & CO. LTD., 101, High Street, Whitechapel, London, E.1; Boots, Shoes, Electric Lamp Bulbs, Haberdashery and Textiles.
1936—No. 485	HORNE BROTHERS LIMITED, 90 and 92, Oxford Street, London, W.1; Boots, Clothing, etc.
1936—No. 486	R. J. & A. R. PITCHERS LIMITED, Rock Place, Godalming; Woollen Goods.
1936—No. 487	SAXONE SHOE CO. LTD., Kilmarnock; Boots and Shoes.
1936—No. 488	THE SOUTH WESTERN DAIRIES LIMITED, Sherborne, Dorset; Butter, Cheese, Cream and Honey.
1936—No. 489	LUKE TURNER & CO. LTD., Deacon Street, Leicester; Elastic Webbing.
1936—No. 490	COHEN & WILKS LIMITED, Aquatite Mills, Derby Street, Cheetham, Manchester; Clothing, etc.; ex Leeds.
1936—No. 491	COHEN & WILKS LIMITED, Aquatite Mills, Derby Street, Cheetham, Manchester; Clothing, etc.; ex Manchester.
1936—No. 492	THE DUCHESS OF DEVONSHIRE DAIRY CO. LTD., Tiverton, Devon; Butter, Cream, Eggs, Cheese, Fish and Meat Pastes, etc.
1936—No. 493	EUGENE LIMITED, Edgware Road, Hendon, London, N.W.; Paper Sachets and small parts of Hair Waving Machines.
1936—No. 494	THE FORE STREET WAREHOUSE CO. LTD., 104, Fore Street, London, E.C.2; Drapery, etc.
1936—No. 495	GRIFFITH & DIGGENS LIMITED, Palace of Industry, Wembley, Middlesex; Waxed Paper.
1936—No. 496	JAMES McNEE & SON, Strathearn Preserve Works, Crieff, Perthshire; Preserves.
1936—No. 497	PARAMOUNT BETTING SYNDICATE LIMITED, Ring Road,, Wortley, Leeds; Clothing, Drapery and General Stores Wares. *(Applicable also to traffic consigned by one Associated or Subsidiary Company.)*
1936—No. 498	PIRIE APPLETON & CO. LTD., Aldgate House, 46–58, Mansell Street, London, E.1; Paper, Stationery, etc.; ex Bucksburn and Aberdeen;
1936—No. 499	CHARLES EVESON LIMITED, Vicarage Road, Lye, near Stourbridge Aluminium Ware, Enamelled and Galvanised Hollow-ware. *(Applicable also to traffic consigned by one Associated or Subsidiary Company.)*
1936—No. 500	THE MURPHY CHEMICAL CO. LTD., Wheathampstead, Herts; Winter Wash, Calcium Hydrosulphide, Insecticides, Sulphur, Copper Fungicides, etc.

Central Argentine Railway Limited

NOTICE IS HEREBY GIVEN that the Transfer Books of the 5 per cent. Redeemable Debenture Stock, 1967/87, will be closed on 10th October, 1936, for one day only for the preparation of Warrants for interest for the half-year ending 31st October, 1936.

RONALD LESLIE,
London Manager and Secretary.

3A, Coleman Street,
London, E.C.2.
6th October, 1936.

TEST ROOM ASSISTANTS.—Railway Signal relay testers and adjusters wanted for Wembley factory. Consideration will be given to improvers having suitable bench experience. State age, qualifications, and wages required.—Box No. 22, c/o THE RAILWAY GAZETTE, 33, Tothill Street, S.W.1.

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

Universal Directory of Railway Officials and Railway Year Book

42nd Annual Edition, 1936–1937
Price 20/- net.

This unique publication gives the names of all the principal railway officers throughout the world, together with essential particulars of the systems with which they are connected. Much general and statistical information about railways is also concisely presented.

THE DIRECTORY PUBLISHING CO. LTD.
33, Tothill Street, London, S.W.1.

THE L.N.E.R. MUSICAL SOCIETY.—The twenty-eighth annual meeting of the L.N.E.R. Musical Society was held in the board room at Liverpool Street station on September 30, with Mr. William Whitelaw, President of the society, in the chair. On the motion of the chairman, seconded by Mr. A. J. Stevens, the report and balance sheet for the past season were adopted. The officers of the society and the members of the committee were then re-elected. Mr. Charles Bowles proposed and Mr. W. Eaton seconded "That the best thanks of the members of the society be given to the chairman, directors, and officers of the company for their kind and valuable support, and to the officers of the society, and the chairman and members of the committee for their esteemed services." This was responded to by Mr. C. H. Newton, chairman of committee, who spoke of the pleasure it gave the executive to do all in their power for the society's well-being. Mr. Whitelaw, in reply to a vote of thanks, complimented all connected with the society on the excellent concerts which their efforts secured. The first concert this season will be held on November 30.

Railway Share Market

Aided by the active general market conditions which have prevailed since the beginning of the new Stock Exchange account on Monday and by the publication of another excellent batch of traffic figures, there has been a further upward movement in home railway stocks.

Southern preferred was again favoured on the good yield offered and was active around 98. The market expects that before long the price will go to par. The deferred was also prominently active with a rise to 25. The past week's traffic gain of £29,000 was up to best expectations and the improvement in tourist traffic which is already reported is likely to be assisted by the through train ferry service to the Continent which is to commence next week. Great Western ordinary continued to attract attention around 59 in response to the belief that the South Wales coal trade will become increasingly active. This railway also reports a traffic gain of £29,000 for the past week. L.M.S. ordinary was active but little changed in price at 29, despite the traffic gain of £78,000 for last week—this week's figures are likely to bring the aggregate increase in the railway's traffics to virtually the £2,000,000 level for the current year to date. Both the 4 per cent. preference and 1923 preference were bought on any reaction; the yields offered seem attractive, particularly in the case of the last-named stock.

The L.N.E.R. first preference was strong and the second preference was steady, while the preferred and deferred were reported to be more active. Last week's traffic increase of £44,000 was somewhat lower than expectations, but there is general confidence that the first preference dividend will be paid in full for the current year, although hopes of a small payment on the second preference appear to be diminishing. London Transport "C" were steadier, the tendency being to await the report and accounts which are likely to show the dividend recently declared on this stock to be a conservative payment.

Foreign railway stocks have been less active and profit-taking was in evidence in those of the Argentine companies. B.A. Gt. Southern and B.A. Western issues were adversely affected by the preference dividend decisions, although, bearing in mind the traffics in the past financial year, it is difficult to see how any other decisions could have been expected. San Paulo have moved up further on balance and Leopoldina preference was good, while Nitrate Rails improved further. American railroad stocks were strong and favourable recovery was shown by Canadian Pacific.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1935-36	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1935	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1935	Prices: Lowest 1935	Prices: Oct. 7, 1936	Yield (See Note)
				£	£		£	£	£					
South & Central America.	Antofagasta (Chili) & Bolivia	834	4.10.36	15,110	+ 3,890	40	540,810	487,090	+ 53,720	Ord. Stk.	23	14 15/16	21	Nil
	Argentine North Eastern ..	753	3.10.36	10,241	+ 1,428	14	130,427	118,891	+ 11,536	,,	7	4	6	Nil
	Argentine Transandine ..	—	—	—	—	—	—	—	—	A. Deb.	49 1/2	30	47 1/2	8 7/16
	Bolivar	174	Sept., 1936	5,200	+ 200	39	57,700	55,300	+ 2,406	6 p.c. Deb.	13	5	7 1/2	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	14	11	16 1/2	3
	Buenos Ayres & Pacific ..	2,806	3.10.36	77,235	+ 3,204	14	1,019,869	1,008,914	+ 10,955	Ord. Stk.	101 1/2	47 8	11	Nil
	Buenos Ayres Central ..	190	19.9.36	$150,700	+ $11,600	12	$1,568,300	$1,516,400	+ $51,900	Mt. Deb.	21	10	20	Nil
	Buenos Ayres Gt. Southern	5,084	3.10.36	112,000	— 1,925	14	1,500,902	1,670,583	— 169,681	Ord. Stk.	27	13 1/2	22	Nil
	Buenos Ayres Western ..	1,930	3.10.36	41,588	+ 3,221	14	540,584	559,610	— 19,026	,,	24	10	18	Nil
	Central Argentine	3,700	3.10.36	146,894	+ 29,165	14	1,886,253	1,659,906	+ 226,347	,,	177 8	7	17 1/2	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	9	3 1/4	9 1/2	Nil
	Cent. Uruguay of M. Video	273	26.9.36	10,749	+ 2,623	13	135,606	108,201	+ 27,405	Ord. Stk.	8 1/2	3	5	Nil
	Do. Eastern Extn.	311	26.9.36	1,766	+ 532	13	22,315	18,106	+ 4,209	—	—	—	—	—
	Do. Northern Extn.	185	26.9.36	1,286	— 16	13	18,797	14,458	+ 4,339	—	—	—	—	—
	Do. Western Extn...	211	26.9.36	923	+ 29	13	12,204	9,828	+ 2,376	—	—	—	—	—
	Cordoba Central	1,218	3.10.36	28,350	— 1,260	14	483,960	450,840	+ 33,120	Ord. Inc.	4	1	2	Nil
	Costa Rica	188	July, 1936	21,438	+ 7,708	4	21,438	13,730	+ 7,708	Stk.	35	30	35	5 11/16
	Dorada	70	Aug., 1936	16,900	+ 4,000	35	112,200	93,300	+ 18,900	1 Mt. Db.	103 5/8	102 1/2	104 1/2	5 3/4
	Entre Rios	810	3.10.36	13,006	+ 1,296	14	173,032	171,363	+ 1,669	Ord. Stk.	15	6 1/2	10 1/2	Nil
	Great Western of Brazil ..	1,082	3.10.36	7,200	— 900	40	290,000	289,000	+ 1,000	Ord. Sh.	1/2	5/16	3/4	Nil
	International of Cl. Amer.	794	Aug., 1936	$317,321	+ $12,980	35	$3,624,632	$3,265,010	+ $359,622	—	—	—	—	—
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	1st Pref.	1/2	3/32	1/2	Nil
	La Guaira & Caracas ..	22 3/4	Sept., 1936	4,350	+ 790	39	41,545	34,985	+ 6,560	Stk.	8 1/2	8	5 1/2	Nil
	Leopoldina	1,918	3.10.36	25,329	— 1,081	40	759,017	697,613	+ 61,404	Ord. Stk.	8 1/2	2 1/2	9	Nil
	Mexican	483	30.9.36	$343,300	+ $30,300	13	$3,309,900	$3,263,100	+ $46,800	,,	1 1/2	1/4	5/8	Nil
	Midland of Uruguay ..	319	Aug., 1936	7,887	+ 2,378	9	15,621	11,011	+ 4,610	,,	1 1/2	1 1/2	5/8	Nil
	Nitrate	397	30.9.36	3,755	— 429	39	93,600	110,154	— 16,554	Ord. Sh.	64/-	42/-	2 5/8	Nil
	Paraguay Central	274	26.9.36	$2,387,000	+ $116,000	13	$33,466,000	$29,128,000	+ $4,338,000	Pr. Li. Stk.	80 1/2	60	72 1/2	31/2
	Peruvian Corporation ..	1,059	Sept., 1936	85,485	+ 16,210	13	257,046	217,772	+ 39,274	Pref.	10 5/8	6 7/16	12 1/2	Nil
	Salvador	100	26.9.36	£11,512	+ £1,333	13	£135,627	£152,540	— £16,913	Pr. Li.Db.	65	61	15	Nil
	San Paulo	153 1/4	27.9.36	26,833	— 1,955	39	1,159,560	947,419	+ 212,141	Ord. Stk.	80	35	84 5/8	3
	Taltal	164	Aug., 1936	3,625	+ 1,205	9	6,150	4,945	+ 1,205	Ord. Sh.	11 11/16	11 8	11 8	8 7/8
	United of Havana	1,353	3.10.36	15,017	+ 104	14	216,842	237,016	— 20,174	Ord. Stk.	3 1/16	1	2 1/2	Nil
	Uruguay Northern	73	Aug., 1936	778	+ 213	9	1,644	1,199	+ 455	Deb. Stk.	4 1/2	2 15/16	4 1/2	Nil
Canada.	Canadian National	23,615	30.9.36	1,183,267	+ 154,061	39	26,889,662	25,026,036	+ 1,863,626	—	—	—	—	—
	Canadian Northern ..	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	78 5/8	52 1/2	70 1/2	5 11/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	103 5/8	93	102 1/2	3 7/8
	Canadian Pacific	17,220	30.9.36	934,000	— 28,200	39	19,988,800	18,408,000	+ 1,580,800	Ord. Stk.	14 1/16	8 5/8	14 1/2	Nil
India.†	Assam Bengal	1,329	10.9.36	33,097	+ 2,179	23	537,914	518,020	+ 19,894	Ord. Stk.	92 1/8	77 1/2	86 1/2	3 7/16
	Barsi Light	202	10.9.36	2,017	— 1,118	23	55,777	65,760	— 9,983	Ord. Sh.	105	77 1/2	69 1/2	7 1/4
	Bengal & North Western ..	2,112	20.9.36	53,878	+ 2,817	25	1,259,127	1,164,038	+ 95,089	Ord. Stk.	30 11/2	291	312	5 1/2
	Bengal Dooars & Extension	161	20.9.36	3,789	— 1,010	25	59,958	61,288	— 1,330	,,	127 1/2	122	125 1/2	5 5/16
	Bengal-Nagpur	3,268	10.9.36	135,525	— 14,640	23	2,672,685	2,823,730	— 151,045	,,	105	100 5/16	102 1/2	3 7/8
	Bombay, Baroda & Cl. India	3,072	30.9.36	214,950	+ 8,700	26	4,048,650	3,811,050	+ 237,600	,,	115 1/4	110	112 1/2	5 5/16
	Madras & Southern Mahratta	3,229	10.9.36	125,475	+ 1,332	23	2,491,213	2,427,187	+ 64,026	,,	128 1/2	113 7/8	112 1/2	8
	Rohilkund & Kumaon ..	546	20.9.36	9,923	+ 1,087	25	246,942	220,324	+ 26,618	,,	294	262	311 1/2	5 1/8
	South Indian	2,532	10.9.36	114,314	+ 9,687	23	1,810,321	1,819,580	— 9,259	,,	119 3/4	104 1/4	103 1/2	5 5/16
various.	Beira-Umtali	204	July, 1936	67,976	+ 3,936	44	645,318	640,305	+ 5,013	—	—	—	—	—
	Bilbao River & Cantabrian	15	Aug., 1936	1,791	+ 628	35	11,993	12,197	— 204	—	—	—	—	—
	Egyptian Delta	620	20.9.36	7,123	+ 854	25	102,452	95,138	+ 7,314	Prf. Sh.	2	15/8	1 3/4	5 11/16
	Great Southern of Spain ..	104	29.8.36	568	- 2,514	35	33,629	62,623	— 28,994	Inc. Deb.	3 1/2	2	3 1/2	Nil
	Kenya & Uganda	1,625	Aug., 1936	166,963	— 1,758	34	1,781,864	1,641,345	+ 140,519	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	48	36	46	7 5/8
	Mashonaland	913	July, 1936	103,104	— 8,610	44	1,019,185	1,159,674	— 140,489	1 Mg. Db.	104 1/4	100	102 5/8	4 7/8
	Midland of W. Australia ..	277	Aug., 1936	11,651	— 393	9	21,865	23,052	— 1,187	Inc. Deb.	98 3/4	93	95	4 5/16
	Nigerian	1,905	22.8.36	23,139	+ 6,078	21	590,693	493,170	+ 97,523	—	—	—	—	—
	Rhodesia	1,538	July, 1936	199,545	+ 401	44	1,868,330	1,923,854	— 55,524	4 p.c. Db.	105 1/2	101	106	3 3/4
	South African	13,263	12.9.36	639,940	+ 68,155	23	14,143,472	12,941,450	+ 1,202,022	—	—	—	—	—
	Victoria	4,728	June, 1936	703,693	+ 16,855	52	9,689,925	9,421,092	+ 268,833	—	—	—	—	—
	Zafra & Huelva	112	May, 1936	8,821	— 2,027	22	48,574	55,398	— 6,823	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements from July 1 onwards are based on the current rates of exchange and not on the par value.